The Builder.

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New York: A Great Growth.

IT is not merely the statement of the New Yorkers that New York has grown with a rapidity hitherto unknown in any of the great centres of population in the world. Actual and accurate statistics regarding America are more startling than even ordinary exaggeration, and we very much doubt whether a New Yorker who has been absent from his native city during the last thirty years,—could such be found,—would not find reason for more frequent surprises on his return than a Parisian on revisiting his beloved boulevards after a similar lapse of time. Now we learn by a recent telegram from New York, that the amount of building in New York is larger than at any time since the great fire of 1835. In the lower part of the city enormous ten and eleven-storied buildings for offices are being erected to meet the demands of business, and give capitalists the opportunity to invest money. In the upper part of the city the new dwellings are numbered by thousands. The effect on wages is 50 per cent. increase. Bricklayers get $4½ a day against $3 last year. Common labourers, like Italian immigrants, get $2½. There is a great demand for carpenters, stonemasons, bricklayers, and builders. They say it would be profitable to import German or English bricklayers and stonemasons, on two years' contracts for double the wages they are getting at home.*

Rapidly within the last generation the "Empire City" has been extending up the tongue of land which lies between the broad Hudson and the North River, and already from the Battery and Castle Gardens,—which speak not alone by their names, but by their still uninjured old-world appearance, of the days when Manhattan was occupied by British red-coats, and took the name it now bears from its Royal governor,—up to Central Park, four miles and more up town, cross streets and long avenues are crowded and filled with houses, the greater part of which have sprung up within only a few years. The building activity of modern New York dates in a great measure from the fevered times which followed the War of Secession; till within some years since the activity continued unabated, to be arrested only a short time in the recent crisis through which America has now happily passed; and as we see by the news above quoted, prosperity again induces the builders to continue their work with a prospect of some years' steady employment before them. To those who know New York, it will be easy to picture the results that will follow on the revival of such an important branch of trade. There is no country where the interests of "real estate" are more closely studied, or where its value as a commercial factor is better understood. In this new impetus given to the building trade it is difficulty to calculate how many more streets up town, how many more "blocks," will be built to add on to the rapidly-extending city.

Thirty years ago, when the late Mr. Haight conceived the idea of building in,—or "on" as our cousins would say,—Fifth-avenue, a house that would eclipse any house which had yet been built in New York, he selected the corner of Fifteenth-street and Fifth-avenue for the spot, his wife, a famous New York beauty of that day, objecting to her husband building further up town, from the fear that they would be at too great a distance from the then fashionable quarter; and now fashionable New York resides in the vicinity of Fifty-eighth-street, in the neighbourhood of the Central Park, which, thirty years ago, was not even dreamed of. In this neighbourhood now magnificent houses abound, owned and occupied by people whose names are as familiar in London society as they are in New York or Paris, houses brilliant with the products of the ornamental centres of Europe. Notwithstanding the fastidious taste shown for many years past in the houses of some of the old English New York residents, we very much doubt whether the new generation, who are doing so much to make New York one of the finest cities in the world, will care to bestow credit or admit a very heavy debt of gratitude to the great social names that in New York, for the last hundred years, have been conspicuous above all others and all comers. From what we remember of the great treasures of art that New York undoubtedly possesses, and is rapidly acquiring, we fancy that the name of Astor, a new name comparatively, must already eclipse the more *dilettante* name of the old English resident and collector, Lenox, although, to draw any comparison between the Lenox library and the collection of pictures, and the more popular and noble foundation of the Astor Library, would partake of the invidiousness that is proverbially odious.

The new move up-town which the revival of the building trade will inevitably cause will probably before receiving another check envelop the Central Park; four years since, when last we saw New York, the few houses that had been built beyond the point at which the park commences, were mostly unoccupied; and the neighbourhood of the American Natural History Museum,—opened at about that time,—will be doubtless rapidly filled up. As an architectural feature the American Natural History Museum probably only merits that praise which is very correctly due to the perfect fitness of the design to the purpose intended, and in this respect certainly the completeness of the arrangement within, and the thorough manner in which the most minute object is displayed in a full light, produce on the mind of the visitor a feeling of admiration that entirely overcomes any disposition to criticise the exterior, although perhaps the most profound expert would find it difficult to quarrel with the manner or the perfection of the workmanship of the whole building.

The neighbourhood surrounding this magnificent institution surpasses all idea that we people at a distance can have in connexion with New York. Before the Museum stretches a park of exquisite beauty,—the Central Park,—nature having been aided by accomplished scientific and artistic gardeners who have studied in the forests and old-fashioned gardens of old England, in the prim and conventional gardens of France and Germany, and in the ideal and poetic villas of Italy and the East, and all this within a few hundred yards of the noble Hudson river, backed by the "Palisades," with their extraordinary geological structure. Here round this Central Park, the name of which indicates its being the proposed centre of New York, houses are springing up in rapid succession, all of which are now almost in immediate communication with Wall-street, at a distance of four or five miles, by means of the elevated railway, and well-made, if as yet scarcely well-kept, roads.

All this is certainly very different from what those who used to know New York can remember. Thirty years ago, when first we saw New York, Fourteenth-street was a quiet substantial street, occupied by a few of the oldest and wealthiest inhabitants, a considerable portion of the land being then occupied by lovely nursery gardens, owned by old Dutch proprietors, who had carried the cultivation of choice flowers to very great perfection, a delightful branch of commerce in which the New Yorkers to this day have retained their reputation. On those old gardens since then have sprung up a class of houses, the rents of which have enriched considerably the descendants of the wise old knickerbockers, many of whom still hold on in the belief that some day the enormous increase of the value within the last few years will augment still more; fortunately for these gentlemen their acquired wealth enables them to pay year by year the extraordinary heavy tax on the estimated value of their at present unrealised property.

Four years ago the building trade of New York was in anything but a prosperous condition. We were in New York at the darkest moment of its financial history; since then, we all know what difficulties the Americans have successfully fought and overcome, and not a week now passes, scarcely a day, that we in England, and that the whole of Europe, are not called

* New York telegram to *Daily News*, July 11, 1881.

upon to express our astonishment, and very often our admiration, for a condition of prosperity that no one doubts must affect greatly in one way or another, and most certainly for good, the whole of the world.

It is not only in New York that the success of America has given a great impetus to the building trade; we are constantly hearing from other great American cities of their rapid increase. With the wildest stories of the marvellous growth of Chicago we have long since become familiar, and Chicago is but one of the many other cities "out West" that, within considerably less than a generation, have been, so to speak, called into existence. In the older States the same changes have been effected. Boston is no longer the Boston of thirty years ago, when first we saw it, not much unlike the old town of ante-independence days, which Fenimore Cooper has so well described. Providence, Rhode Island, was a village then, and now possesses one of the largest hotels in America; and many another quiet old half-English town that smacked strongly of the days of British rule, and even of those when the "bulbous-bottomed burghers" of Washington Irving's ever-genial and amusing history, smoked their long pipes under the shadow of old trees, or of their own scarcely less umbrageous broad-brimmed hats, outside their old red-brick, crow-stepped gabled Dutch farm-houses, the last of which, by the way, disappeared from New York not so very long since.

Thirty years ago Washington presented all the appearance of a charming old colonial village, the chief houses of the officials, the old residents, and the best hotels being low houses, many of them built, like the Anglo-American houses of that time, of wood, comfortably surrounded by their verandahs, and in most cases embowered in shady trees, like the famous house of the Spanish ambassador, Calderon de la Barca, the husband of the still more interesting Madame de la Barca,—a Scotchwoman and the authoress of a work on Spain that, by this time, must, from circumstances known doubtless to many collectors, be one of the very rare books for which America and Americans are now giving such enormous prices. Our own ambassador at the same time, Sir Philip Crampton,—one of whose unpaid *attachés* was then the present Earl of Lytton, since Governor-General of India,—lived also in a delightfully shady house over-looking the Potomac. Those were days when a few minutes' walk or drive brought one into what appeared to be the remote recesses of a primæval forest.

Since then, and of course since the War of Secession, building interests in Washington have been somewhat active. Young men who have grown up in Washington within the last thirty years regard it, even after visiting the Continent, as a second Paris. As it was when we first saw it, its appearance was almost, with the exception of the Capitol,—then not a fourth of its present size,—and one or two other public buildings, the Smithsonian Institute among the number, like Tunbridge Wells, or some such other cool retreat. What the "White House" was then, it still is, though what the "White House" of the future is likely to be, Americans alone, with the assistance of the architectural learning of Europe, can determine.

As a natural consequence, the enormous increase in the number of residences that are being built in Washington, New York, and elsewhere, will have the immediate effect of enlarging all the Northern summer resorts. Washington, particularly, being blessed, or cursed rather, by a climate that makes it like many other American cities, an unendurable summer residence for all but the now happy negro population, and those unhappy Government officials, whose felicity alone consists in the obscurity of their positions allowing them at least the indulgence of the pleasure that comes with the security of permanent appointments; but even the Government clerks, those who do not go out at the end of every four years, are obliged to get away during a month or two of the hot season, and away they rush to those delightful resorts, if not to the North and the sea-side, to the White Sulphur Springs and the Sweet Sulphur Springs in the mountain ranges of Virginia, where, thirty years or so since, there existed a society from the South, that would have been a sufficient attraction without the natural advantages afforded by the delightful springs themselves and the cool shade of the surrounding woods.

A LITTLE MORE ABOUT DRAGONS AND ANGELS IN ART.

ALTHOUGH the name "dragon" is sometimes applied to any gigantic and formidable reptile, there can be little doubt that the normal type of the Mediæval dragon was a winged monster. We may cite the authority of Linnæus, in the name he gave to a lizard, which, though not furnished with true wings, has a pair of membranous expansions on its sides, which sustain the creature in a leap through the air, the *Draco volans*. Before the time of Cuvier, the specific name given to this small lizard may be said to have represented the only link that existed between the science of the naturalist and the dragons of mythology. But palæontology had not advanced very far before it taught us that a winged reptile was not an imaginary creature, but one that ranked among the extinct forms of life that once inhabited our planet. The pterodactyl, or wing-finger, was a true flying reptile, of fiercely predacious and carnivorous habit,—as formidable an assailant in the air as the crocodile, a survival of the numerous water dragons of the herpetiferous strata, is in the water. The discovery, so late in the course of time, of the fact that the winged dragon has been an undoubted denizen of our planet, leads to the question whether any form of pterodactyl, or of other winged reptile, lingered until historic, or at least until human times. Invention is rarely original; and for a truly original invention to turn out to be a true description of something wholly unknown to the inventor, is a phenomenon as yet unknown. It may be said that the winged dragon of mythology is not identical in the arrangement of its wings with the pterodactyl. Were we to see that creature in life, however, it is hardly probable that our attention would be riveted on the articulation of its wing-bones. Still less is this likely to have been the case in those earlier times when all that was known of anatomy was derived from observation of wounds in battle. Of course, no one is in a position to assert dogmatically that the mythical dragon is really a tradition, not an imagination; but the subject is not unworthy of consideration. The accounts, some of which are indisputable, of the sea-serpent, have been thought by some naturalists to denote the survival of some rare specimens of the plesiosaurus, a contemporary of the pterodactyl. Unless the creature be an enormous conger,—of the limit of age and size of which creature we have no positive knowledge,—we seem to have little choice but to regard it as some rare and all-but extinct saurian. Such might have been the sea-dragon from which Andromeda was rescued by Perseus. The dragon depicted by Moritz Retz as devastating Rhodes comes within historic times; for Dieudonné de Gozon, the young knight who slew the monster, according to the legend, is known to have been a Grand Master of the Order of St. John of Jerusalem. Hence there seems to be a nucleus of truth in the legend, though it is possible that the dragon in question was an enormous snake.

The power of transformation, or the phenomenon of attaining, at a certain age, a form unlike that worn at birth, which is characteristic of the class *Insecta*, is found among one great group of reptiles; although that is a group widely differing from the Saurians, or dragons. It is that of the Batrachia, or frogs. In the spring of 1880 we witnessed a spectacle that was perfectly new to us,—that of a number of little frogs, in a garden pond, hopping merrily before they had lost their tails. They were like little efts,—or rather like little crocodiles, with four well-formed legs and long tails, but had exchanged the movement of the tadpole for that of the frog. Generally, we think, the tail becomes absorbed before the creature leaves the water. The cuirassed pirates of the ancient oceans are represented, to a certain extent, by another reptile family, the Chelonia, among which one, called the snapping turtle, which is something like a snake furnished with a carapace or shell, into which to retreat, is a very formidable carnivore. The magical power of transformation possessed by one reptile group may in old times have added to the uncanniness of reptiles as a class. Poetry and art have been in accord in giving reptile characteristics to the personification of the Power of Evil. It is possible that the terror caused by the subtle movement, enormous strength, and (occasionally) fatal venom of some of the great ophidia, or snakes, may have led to that association. Yet if there be any form which is more unlikely to be provided with wings than another, it is that of the serpent.

We cannot pretend to assert that the wings of the Mediæval dragons have any other origin than the imagination. But it must be confessed that the discovery, so long after the form of the winged dragon had become conventionalised in art, of the remains of actually winged dragons, forms a subject worthy of further consideration.

As to angels, it may be added to what has been already said in these columns, that it is remarkable that no word corresponding to our ordinary idea of an angel exists in ancient Semitic literature, although there are twelve words that are occasionally used, as now understood, to denote celestial messengers or intelligences. So fully, however, is our first remark justified, that we find the rabbinical writers positively transliterating the Greek or Latin *angelus* or messenger into the barbarous form *angla*. Among the words of ordinary meaning, applied in a special sense to designate supernatural beings, are not only the well-known Cherubin and Seraphin, Thrones, and Powers, but the words men, gods, sons of god, sparklers, watchers, wheels, and beasts, or living creatures. We spare our readers the cumbrous Aramaic forms. A considerable amount of angelology had been compiled before the date of the close of the Gemara, about 500 A.U. Thus we hear of Duma, the angel of silence; Yarek, the prefect of hail; Yohach, the angel of travel; Lajelah, the angel of child-birth; Asariel, the prefect of the waters; Suriel, the prince of the Divine Presence; Gabriel, Uriel, Raphael, Michael, Zadkiel, Hanael, and Cassel, the angels of the Seven Planets. The most terrible name in the shadowy host is that of Samael, the prince of the air, a malignant angel, who is sometimes identified with the planet Mars. Asmodai is another evil name, whether applied to the same impersonation or not is questionable. Argentin, the prefect of baths, seems to denote by the name a Latin origin, though the word is found in Aramaic.

It is tolerably clear from this brief abstract of a somewhat extended study of the subject, that the Semitic imagination, however much indebted to Persian or Assyrian influence, ran riot in the regions of the invisible quite as much as did the Latin fancy. The prohibition to represent animal forms, however, has had the result of confining the knowledge of the Semitic angels to the few students of this literature. Among the Latins, on the contrary, the few types that have been embodied in stone, or depicted on canvas or on glass, have survived the literature which gave them birth, and still tell, in many a shadowy nook of ancient church or cathedral, of the visions of horror or of beauty in which the imaginations of our ancestors were wont to indulge.

THAMES BRIDGES.

THE course of a few years will make an immense difference in the aspect of many of the bridges over the Thames. At Putney the right line of the road will be restored; the hideous aqueduct that now crosses the river (in that line) will be removed, as well as the tottering and decaying pile of the old wooden bridge, and a stately granite structure, built at a large cost, will provide for both road traffic and water conduit.

At Battersea, we now learn that an iron bridge of five spans is to replace the seventeen apertures of the old wooden structure. The centre span will be 173 ft. wide, with a height in the centre of 15 ft. above Trinity high-water mark, which is 6 ft. more than the present clearance. The width of the roadway will be 40 ft., instead of the present 23 ft. The estimate of 231,000*l.*, if verified by the construction, does not appear an out-of-the-way one for this great architectural improvement as one mode of crossing the Thames at Battersea. We may add that it is to be hoped that the new line for which the London and South-Western Railway have obtained a Bill, will enable the traveller to get from Guildford to Chiswick in less than two hours and a half.

Highbury Institute of Art, Science, and Literature.—The committee has succeeded in passing the candidate for Advanced Building Construction at the South Kensington Examination. The winner of the certificate is Francis J. Bancroft, a junior in the Highways Department of Islington Vestry. This speaks well for the instruction given by the drawing-master, as the questions are difficult ones to answer by a student of seventeen.

INTERNATIONAL MEDICAL AND SANITARY EXHIBITION.

THE OPENING CEREMONY.

THE proceedings in connexion with the opening of this Exhibition took place in the Royal Albert Hall on Saturday afternoon last, the President, the Right Hon. Earl Spencer, K.G., Lord-President of the Council, in the chair. There was a large attendance of ladies and gentlemen.

Earl Spencer said he owed the honour which he had of presiding over that meeting, firstly, to the fact that the illustrious patron of the Exhibition, H.R.H. the Duke of Edinburgh, was away with one of Her Majesty's fleets in the Baltic; and, secondly, in all probability, to the fact that he was now at the head of a department of the Government from whom some of the galleries in which the Exhibition was arranged, were held. He belonged to that department of Her Majesty's Government to whom were referred any large questions touching medical education in this country, and he had lately felt the great responsibility of his position, by having assigned to him the difficult task of appointing a commission to consider a subject of great medical importance to this country,—a commission which he hoped would lead to changes in the law with regard to medical education which would be greatly conducive to the welfare of the community. He should not detain the meeting very long by the few remarks which he thought it to be his duty to offer on that occasion. He could not help referring to the great improvements which had been made during the last fifty years in sanitary matters,—improvements which had tended so greatly to improve the health of the community. Such improvements had been a necessary condition of the development of the resources and wealth of the country. The health of vast masses of the population had been beneficially affected by public works of reclamation which were now to be seen in all parts of the world. Marshes from which used to spring fatal agues and malaria were now to be seen converted into fruitful and wholesome fields and farms. Such improvements as those to which he was referring had removed one of the great impediments in the way of the health, and therefore of the wealth, of the community. Other public works that had been carried out, such as the drainage, lighting, and water-supply of our towns and villages all over the kingdom, and, last though not least, the improvement of the dwelling-places of the people, had been no less beneficial in their results. All the improvements he had mentioned had, he ventured to think, exercised a vast influence on the health of the community, and those who were engaged in the Legislature of the country were from time to time brought into contact with facts which showed that to be the case. Again, very many of those who were connected with the work of local government, or with the management of private property, had largely given attention to the work of sanitary improvement in the directions he had indicated. But, while referring to what public men, people connected with local government, and managers of private property, had done and might do for the good of the health of the community, he must not forget to make special allusion to the energy, ability, and activity of the members of the great medical and surgical profession. He ventured to think that, during the last fifty years, the greatest possible improvements had been made in the way in which the members of that distinguished profession had carried out their work. They had availed themselves of the appliances of modern science, which they used for the alleviation of pain and for the promotion of the health of the community. He was glad to be able to refer to one proof that such efforts had not been wanting in success in achieving the desired end, at any rate in this country. It was only the other day that a colleague of his, in presenting to Parliament the preliminary abstract of the Census just taken of the population of the United Kingdom, referred to a fact upon which he thought they might all congratulate themselves very much. He referred to the fact that the death-rate of the kingdom during the last ten years had most notably decreased,—to such an extent, indeed, that during the last ten years 300,000 lives had been saved, which would have been lost had the death-rate of the preceding decade continued. Without doubt, that diminution in the death-rate was largely due to improved sanitary conditions. He believed that the Exhibition which the meeting was met to open would be of great value by bringing together the experience of the medical men, architects, and sanitary engineers not only of this country, but of every part of the world. That, he thought, would be a great advantage to all those who had the health and prosperity of the people at heart. He believed also that the value of the Exhibition would be greatly enhanced by the international congress of medical men, which was shortly to be opened. That congress would no doubt also have an important bearing on the Exhibition. The Exhibition, he might add, was divided into two classes or departments, the Medical and the Sanitary. Those who were specially interested in or identified with the medical profession would find in the Medical Department all the newest surgical inventions and appliances, and all other matters which would conduce to the well-being of those who had to undergo painful operations, or who had to endure sickness of any kind. There was also exhibited almost every drink recommended by the faculty, from Apollinaris water to decoctions of the bitterest drugs known in medicine. The visitor to the Sanitary Department of the Exhibition would, he was sure, be struck by the infinite scope and breadth of that part of the display. There would be found there not only all the best models of house drainage, both internal and external, but illustrations of all the best systems and appliances which had been devised for the drainage of towns and villages. There would also be seen almost every conceivable appliance, from the best means of warming and ventilating a house to the best kitchen stoves and utensils. There were also to be seen the best and most wholesome means of house decoration in lieu of poisonous wall-papers. In short, every conceivable sanitary material and appliance was to be found in the Exhibition, and everybody who was building or furnishing a house, whether a mansion or a cottage, would be able to see how very much the appliances and fittings of a house contributed to the health or illness of its occupants. To neglect the teachings of sanitary science was to encourage sickness and ill-health On the other hand, adherence to the soundest and wisest principles of sanitation in the fittings and arrangement of a house could not but conduce to the health of those who lived there. He most heartily wished the Exhibition every possible success. He wished it success not only at the present time, and during the time it continued open, but a more permanent success, and he sincerely trusted that it would enable those who had the management of that admirable institution, the Parkes Museum of Hygiene, to put that museum on a permanent basis. The Museum bore the name of a distinguished man, a leader in the work of hygienic reform, and he trusted that the efforts which were being made to give it a permanent home worthy of it would be crowned with success. Without saying anything further at that moment, he would call upon Dr. Poore, the hon. sec. of the Parkes Museum, to read a statement explanatory of the origin of the Exhibition.

Dr. G. V. Poore then read the following statement:—

"MY LORD,—As the honorary secretary of the Parkes Museum of Hygiene, the duty devolves upon me of stating briefly the origin of the International Medical and Sanitary Exhibition, which is inaugurated to-day.

The Parkes Museum, which was formally opened on June 28th, 1879, by Sir R. A. Cross, G.C.B., has clearly met a great public want. It has been opened gratuitously to the public on three days in each week, and the number of visitors, which amounted to 2,166 in the first year of its existence, increased to 2,540 in the year which has just closed.

The practical lectures which have been delivered to artisans, workmen, and others, have been attended by numbers which have steadily and progressively increased, so that latterly they have been in excess of the accommodation which the museum in its present situation is capable of affording.

Thus encouraged, the Executive Committee thought that a successful attempt might be made to organise an exhibition of sanitary appliances on the occasion of the assembling in London of the International Medical Congress. This idea was received with approval on the part of the officers of the Congress, and in order that the exhibition might have an additional interest for our medical guests, it was resolved to make it representative of Medicine as well as of Hygiene, and it was finally decided to include in it anything which might reasonably be considered of use in the prevention, detection, cure, or alleviation of disease.

A sub-committee of the Executive Committee of the Parkes Museum was appointed, with power to add to its number any persons likely to forward the interests of the exhibition, and the Exhibition Committee, as finally constituted, consisted of Mr. Erichsen (the late president of the College of Surgeons) as Chairman, the president of the Pharmaceutical Society, a professor of hygiene, two physicians, three surgeons, three architects, and two engineers, with a surveyor, Mr. Judge, as secretary.

The labours of this Committee have been considerable, but they have been much lightened by the sympathetic co-operation met with on all sides.

To the Royal Commissioners for the Exhibition of 1851, to the Council of the Royal Horticultural Society, to the Science and Art Department, to the Director of the South Kensington Museum, and to the President and Officers of the International Congress, their thanks are especially due.

The Exhibition Committee are proud to be able to state that His Royal Highness the Duke of Edinburgh has graciously consented to become the Patron, and that the Lord-President of the Council has courteously accepted the office of President of the Exhibition.

The Executive Committee of the Parkes Museum, while they have every reason to feel satisfied with the work which they have accomplished, are not without anxieties for the future. The present home of the Museum is daily becoming more inadequate, and the funds at their disposal are barely sufficient to pay the very small current expenses. Their ambition is to permanently establish the Parkes Museum in a building of its own, and they are not without hope that the International Medical and Sanitary Exhibition may be the means of directing public attention to the needs of the parent institution. Should this Exhibition prove financially successful, the profits will be handed to the treasurer of the Parkes Museum, and it is hoped that the knowledge that one of the ultimate aims of the Exhibition is to assist in the permanent establishment of the Parkes Museum, will prove an additional incentive to the public to visit the International Medical and Sanitary Exhibition."

Mr. Mark H. Judge, secretary of the Exhibition Committee, read the following report:—

"My Lord President, my Lords, Ladies, and Gentlemen,—The brief statement I have the honour to make to you on behalf of the Exhibition Committee must, I think, gratify both the exhibitors and the public generally, since it clearly shows that the interest taken in this, the first International Exhibition of its kind, has been of an eminently practical character.

It was natural that the committee should count upon receiving the co-operation of their own countrymen in an undertaking which could not fail to benefit this country, but they could hardly have expected the large amount of support that has come from the people of other countries.

The exhibits are divided into seventeen sections, and they represent almost every industry connected with Medicine, Architecture, and Sanitary Engineering. One feature specially worthy of mention is that the work of artisans is exhibited by themselves.

Besides the exhibits which have been contributed by London, Dublin, Edinburgh, Glasgow, Liverpool, Manchester, Birmingham, and other large towns in the United Kingdom, the following countries have sent contributions, viz.:—France, Germany, Austria and Hungary, Italy, Switzerland, Turkey, Holland, Belgium, Norway and Sweden, Bohemia, Bavaria, India, and America.

Thanks to the heartiness with which the exhibitors have fallen in with the arrangements made by the committee, the exhibition that you have been invited to inspect to-day is not in an unfinished condition, but is full and complete.

It was at first intended that the judges of the different sections should make their awards to the exhibitors on the opening day, but the extent of the exhibition has made it necessary for them to prolong the time for their examinations, and therefore the awards will not be made until next week.

The public spirit shown by the subscribers to the Guarantee Fund should not be overlooked, as without this the committee could not have ventured on an undertaking of such magnitude.

With such an inaugural meeting as the present, there can be little doubt that this exhibition will be the means of providing a considerable sum for the Parkes Museum, and at any rate it is sure to stimulate invention and improvement in all that relates to health."

The Right Hon. Earl Granville, K.G., said that at a time such as that, when London was so full of business and of pleasure, the presence of so many ladies and gentlemen as he saw before him was a very clear indication of the interest which was excited by the objects of the Exhibition,—objects so very wide that, as Lord Spencer had described them, they included house drainage, architecture, engineering, furniture, food, clothing, and the prevention of disease. He must admit that when he received his card of invitation to attend the meeting, and found insidiously inserted on the back of it that he was expected to deliver an address, and that he was to be followed by Sir James Paget, his heart sank within him; but he had been somewhat relieved by the fact that the two excellent reports which had been read, and the singularly clear and lucid statement of Lord Spencer, left him very little to say. Perhaps the committee, in inviting him, were desirous of imitating the practice that now obtained in some of our theatres. The managers of those establishments, desirous of meeting the requirements of those who came early and liked a quantity for their money, and of those, on the other hand,

who liked to dine comfortably before the evening's amusement, advertised the great piece of the evening to begin at eight o'clock, and in smaller letters on the bills they announced that some trifling play would be enacted before it, so as to amuse the early-comers, and to whet their appetite for the chief performance of the evening. In the same way, he supposed he had been invited to speak in order to whet the appetite of the audience for the address of Sir James Paget He thought it was Dr. Parkes himself who defined hygiene as the art of preserving health,—in other words, the art of giving the most complete action to the mind and body for as long a period as was consistent with the laws of life. All people, sometimes voluntarily, sometimes involuntarily, thought and talked of health; and he ventured to say that if anybody were rash enough to admit in company that he had some indisposition, he would find the majority of those present eager to prescribe for his diet and his regimen, everybody having some favourite pills to recommend. He remembered some years ago having a severe attack of gout while in Rome. As soon as the news spread he was immediately inundated with prescriptions, not only in English, but in Italian, French, German, and even Russian. The Cardinal-Secretary of State was good enough to tender him some advice based on his own personal experience; another foreign minister gave him exactly contrary advice; and such was the happy result of that combination of prescriptions that he did not get well until he had left the grand old city behind him. In Easter of the present year,—it being a dull season with the newspapers,—a report was published that he had a serious attack of gout. It was a subject very unworthy of attention, and, luckily for him, the report was entirely without foundation, but nevertheless, he had been most deeply touched since that announcement by the receipt, daily and even hourly, of letters of advice upon that, to him, interesting topic. He had been advised to drink whisky, he had been advised to drink claret, he had been advised to adhere to the most rigid teetotalism, he had been advised to live generously, and he had been advised almost to starve himself; while one gentleman, whom he had no reason to suspect of being a dentist, advised him to provide himself with a complete apparatus of artificial back-teeth. The moral he gathered from all that, was that even for maintaining the health of a single individual, study alone, or experience alone, was not sufficient. He believed that they required science, art, and experience combined to be of use in such matters. Now, if that was the case with regard to the health of an individual, how much more was it so with regard to the health of large communities! Lord Spencer had referred to some very satisfactory statistics gleaned from the recent census. That census showed how the population of this country was increasing. With regard to the metropolis alone, the numbers very nearly approached the enormous total of four millions! Many of those present would remember the observations of Archbishop Whately with regard to the great problem of affording food to such agglomerations of human beings occupying a comparatively small area. How easily the work of providing such vast masses of men, women, and children had been done by their fellow-beings, prompted by self-interest, and how impossible would it be for the Government to do such work efficiently and without enormous waste! But, besides air and food, there was water,—which was a prime necessary of life, whether for drink, for purposes of cleanliness, or for its use in antagonism to fire. That was a thing which could not be in all cases effectively provided by private enterprise. If it were to be provided either by the Imperial Government or by local authorities, it ought to be on the best possible principles both as to quality and as to the quantity of the supply. He considered that in this great city of London we were most imperfectly provided with water. The question was one beset by difficulties, and was one among others in which specialists could do much, by the dissemination of sound principles, to develop a healthy public opinion. He believed that exactly the kind of sanitary information which was desired would be furnished by the Exhibition about to be opened,—an exhibition which was the outcome of the Parkes Museum of Hygiene. Her Majesty's Government were perfectly alive to the importance of sanitary questions. The meeting would be aware of the causes which had made the present session so barren of legislation on questions of that kind. He was happy to say, however, that there was one measure with regard to the flooding of rivers,—a matter which bore most essentially upon the health of many towns and villages,—which had been got to such a stage that the Government had a very strong hope of being able to pass it into law this session. He knew that the path of the sanitary reformer was not always a smooth one. The subject itself in some of its details was of a disagreeable character. There were many obstacles to the progress of sanitation, as such veteran reformers as Mr. Chadwick could testify, including vested interests,—or fancied interests,—in many forms. Of one thing he was quite sure, namely, that the friends and fellow-labourers of the late Dr. Parkes would feel that their reward would be ample if, through creating the Parkes Museum as a memorial of his connexion with University College, and in commemoration and perpetuation of his untiring devotion and great services as a sanitary reformer since the time of the Crimean war, the Exhibition which was the outcome of that Museum should be the means (as it was likely to be) of greatly increasing the interest of the public in sanitary matters. It was a happy idea to have held the Exhibition during the visit of about 600 medical men from all parts of the world. The International Medical Congress would be attended by some of the most eminent medical men in the world, and he had not the least doubt that the result of their deliberations and of the teachings of the exhibition would be the dissemination of much useful information as to the laws of health, and that such information would be immensely conducive to the well-being, not only of the bodies, but of the minds and characters, of their fellow-creatures all over the world.

Lord Spencer explained that the Right Hon. J. G. Dodson, M.P., who had promised to be present if possible, had been prevented from attending owing to the pressure of important official duties.

Sir James Paget said he should not have ventured to address the meeting,—which was essentially a meeting for the opening of the Exhibition,—but for the relation which had been mentioned as subsisting between the Exhibition and the International Medical Congress. It was in the first instance suggested that the organisation of such an Exhibition would be a proper part of the duties of the executive committee of the International Medical Congress, but for various reasons it was decided that the work of organising the exhibition should not form part of the duties of the Congress Committee, who felt that they would have enough to do without undertaking the great amount of labour that the organisation of such an exhibition involved. What had been achieved by the Exhibition Committee was enough to prove that the Congress Committee were right in leaving the Exhibition in the hands of a separate committee, who had devoted an amount of energy to the work which would have been quite beyond the power of the Congress Committee, although the latter were served by that most admirable of general secretaries, Dr. MacCormack, to whom, if the Congress was successful, as it could hardly fail to be, more than nine-tenths of the credit of such success would be due. The results shown by the Exhibition Committee, in the number and variety of the appliances and materials exhibited, were beyond what the most sanguine promoters of the Congress could have dreamt of. It was an Exhibition of which he believed the country might well be proud and one which would be fraught with instruction and pleasure to the distinguished foreigners who would visit it in connexion with the Congress, and who would find much in it not only to criticise and to advise upon, but to admire and learn from. Although we in this country might justly be dissatisfied with the present hygienic state of England,—and, he might add, they were proud of their dissatisfaction, for there was no ignorance so dangerous as that which was supported and perpetuated by self-satisfaction,—yet we had very much to show for the results of the teaching of sanitary science in the country during the last few years, thanks to the intelligence and industry of a comparatively small band of sanitary reformers. Lord Granville had mentioned with commendation the name of Mr. Edwin Chadwick, but he might add to that a long list of names, beginning with that of Mr. Simon. He might also refer to the great mass of knowledge on sanitary matters now in possession of the Local Government Board,—knowledge collected by its army of medical and engineering inspectors, and not to be surpassed in extent or value by that gained in any country in Europe. The difficulty was in applying all that knowledge,—in always doing exactly the right thing under ever-varying circumstances. He thought it was a good omen for the success of the Exhibition and Congress that the Lord-President of the Council was in the chair on that occasion, because he represented that which he believed would be the best work that the Exhibition could do, viz., the work of educating the public in sanitary matters. Presiding, as his lordship did, not only over medical education, but over every branch of education in the kingdom, he did well to recognise that one of the prime objects of the Exhibition and of the Parkes Museum of Hygiene was the education of the public in sanitary matters. He (the speaker) could himself be no efficient judge of the comparative merits of the different preventive appliances that were exhibited, because his life had been spent in trying to mitigate the miseries that resulted from the want of the prevention of disease. No doubt the work of preventing disease was a much happier task than that of trying to cure it. The medical man had very much to be thankful for in the advance of sanitary science. It was a great assistance to him to know that, owing to advances in sanitation, he need not, under proper precautions, fear the spread of infection from one patient to another, and that he need not fear that his skill would be thrown away owing to the foulness of a hospital drain; but that, aided by the art and science of nursing, and the recognition of sanitary laws, his patients now had everything in their favour, and that the curative means he employed would have fair play. Such exhibitions as the one which they were assembled to open must do much to promote a knowledge of sanitation. Amongst the exhibitors themselves, a wholesome rivalry in the attainment of what was as near perfection as possible was set up. Mutual criticism of each other's appliances was likely to bring out the weak and the strong points in such things, — and perhaps the exhibitors looked at each other's goods with keener eyes for defects or improvements than were possessed by the judges of the awards. A spirit of emulation was set up, and the public, in the long run, were the gainers. Another important feature of such exhibitions was their educational effect on the masses of the people. People who visited the Exhibition would learn something about the principles of sanitation, and could exert an influence in favour of sanitation amongst their friends and neighbours, but more especially amongst the poorer classes. He wished it could but be once strongly impressed upon the people, by some strong and lucid speaker, how very completely the wealth of the country was dependent upon the health of the population. The wealth of a country such as England depended in only a very secondary degree upon its climate and its soil, its mines and its industries. Its agriculture and its industries depended far more upon the will and power of its people to work, and such power depended upon strong minds and strong limbs, and these, in their turn, were dependent upon and could not exist without health. In this country, therefore, health was pre-eminently wealth, and he who did not do all he could to promote his own health forfeited his right to wealth, and was guilty of the basest want of patriotism. There was one thing quite certain and fully recognised in Medicine, viz., the relation between constitutional and local disease. Nothing was more clear than that local diseases sooner or later affected the whole body. In the same way, one unhealthy neighborhood, one plague-spot, often infected a whole district, and one district infected another, until the whole tone of life all over the country was sensibly lowered. Knowing this, then, he wished most cordially success to the Exhibition. If he had one other reason why he wished it success, it was that he reverenced the memory of Parkes, and he therefore hoped that the success of the Exhibition would be such as to help in placing the Parkes Museum of Hygiene on a more permanent footing, seeing that that institution sought to perpetuate the work to which Parkes devoted the best years of his life.

The Chairman.—It is now my pleasing duty to declare the International Medical and Sanitary Exhibition open.

Mr. George Godwin, in moving a vote of thanks to the Right Hon. Earl Spencer for presiding, said the resolution which had been

put into his hands was one which needed no commendation or argument on his part. He had proposed to himself to make a few observations on the general subject before speaking to the resolution itself, but he was now afraid to do so lest he should weaken the effect of the very eloquent and admirable address which they had just heard from Sir James Paget. Nevertheless, as representing the Executive Committee of the Parkes Museum of Hygiene and the Executive Committee of the Exhibition, he would venture to add a few more words, as earnest as he could command, to introduce to the attention of the meeting, and to urge the claims, — he had almost said the paramount claims,—of the Exhibition upon the attention of the public and the Press. A very considerable advance had taken place in public opinion on the subject of sanitation since, many years ago, a few earnest men began the work of sanitary reform; but he was afraid, that even at the present time there existed scarcely so agreeable a state of things as might be supposed from the tone of the speeches which had been delivered. Sanitary reform was a matter which still failed to excite a due amount of interest,—one which was still too much neglected. It should be remembered by all that it was not a question of rose-water, or of strains from Hungarian bands, pleasant as such things might be. It was a question of health and happiness,—a question of life and death, and a question on which every man,—aye, and every woman too,—had it in his or her own hands to exercise an influence for good or evil. The object of the Parkes Museum had been, and continued to be, to disseminate generally the truths of sanitary science, and also to show,—what the Exhibition just declared open showed on a larger scale,—the best appliances that could be had for practically applying those truths or principles. It would have given him very great pleasure to have commented upon some of the points suggested by the Exhibition, but opportunity did not permit, though there was one matter to which he would direct attention as illustrating its value in relation to some statistics which had recently reached him. The statistics to which he referred were of especial value in connexion with the plans which were exhibited for the arrangement of hospitals and other institutions of the kind. It appeared to be a well-ascertained fact that the French soldiers who were wounded in the Crimean War, and who were subjected to surgical treatment, died at the rate of 75 per cent. In the American Civil War, on the other hand, the soldiers, who sustained quite as severe and as dangerous wounds as those sustained by the French soldiers, and who were treated with certainly not greater surgical skill than the latter, only died at the rate of 34 per cent. What was the reason of the mortality amongst the American soldiers being less than half that amongst the French soldiers? Simply because the French soldiers under surgical treatment were placed in old-fashioned and badly-contrived hospitals, without any proper arrangements for ventilation and drainage, whereas the American soldiers were placed in single, detached, and even rudely-constructed separate buildings, in which air had free circulation, and good drainage was practicable. In some of our own hospitals there were surgical wards, which were simply places for dying in, and the surgeons knew it, and were helpless. The state of things existing in the houses of the very poor in London and other large towns of the kingdom was still deplorable. It was true that many great improvements, materially lessening the death-rate, had been effected, but still the story of sanitary neglect in the present day was appalling, and called for the paramount attention of every man deeming himself a statesman. He did most sincerely hope that when present difficulties were overcome, her Majesty's Government would evince a great and proper interest in the vital subject of sanitary reform, and that they would press forward necessary legislation on the subject. If the people of this country, especially women, would only make themselves acquainted with the good that flowed from the observance of sanitary laws, and would insist upon their observance, the amount of benefit that would be effected would be greater than could be imagined. He was sure that the meeting was very much pleased with having had Lord Granville and Lord Spencer with them on that occasion, and it was his most pleasing duty to propose that the best thanks of the meeting be given to the Right Hon. Earl Spencer for presiding at the meeting and for so eloquently advocating the objects of the Exhibition.

Mr. J. Eric Erichsen, F.R.S., said that as Chairman of the Executive Committee of the Exhibition, it gave him very great pleasure to second the vote of thanks. The Exhibition was the joint offspring, as it were, of the Parkes Museum of Hygiene and of the International Medical Congress, which was to hold its first meeting in about a fortnight from the time he was speaking. Thus the Exhibition, by some law which was unknown to natural science, had come into the world before the birth of one of its parents. It had, however, strange to say, inherited the good qualities of both of them, for on one side it represented in its full integrity all the wealth of hygienic appliances to be found in the Parkes Museum, and, on the other hand, everything that could minister to the relief of suffering and the cure of disease, and that could promote the alleviation of deformity and infirmity as it affected man. He could truly say that it was a great Exhibition, for it was the greatest of the kind that had ever been got together. It was the natural outcome of the advance of hygienic science which had characterised modern life, for if there was one characteristic of modern life more than another, it was the great attention paid, at any rate by the educated classes, to the study of the laws of hygiene. The civilised man differed from the savage, and the educated man from the uninformed man, in nothing more than in the scrupulous attention paid to cleanliness in all that related to the health of the body and to the surroundings of the home. The civilised and educated man was impelled by his culture to be clean, and it had become an instinct with him to be so. His knowledge told him that disease was largely preventible by the observance of cleanliness, and that, if preventible and not prevented, it was truly self-inflicted. Disease that was self-inflicted was not always of the major kind. Not merely typhoid and small-pox, but the lassitude, the languor, and nervous depression which were so prevalent were frequently found to have their source in faulty hygienic conditions. The law of hygiene was like the moral law. Just as an infraction of the moral law might lead to the pricking of conscience, so a breach of hygienic law led to illness. He was very glad to hear Mr. Godwin allude to the great influence which might be exerted by women in connexion with hygienic reform, because it was to women we must look for the exercise of home influence. Women should be our great hygienists. It was to the wife, not to the husband, to the mother, not to the father, that we must look for the preservation of hygienic conditions in the home. It was to the mother, not to the father, that we looked for the prevention of disease among the children, and for the adoption of those hygienic measures which would lead the children to grow in vigour and health, strength and beauty, and fitted in body and mind for the duties of after-life. He seconded the resolution with much pleasure.

The resolution on being put to the meeting was carried with much applause.

Earl Spencer, in reply, said he thanked the meeting for the very hearty way in which they had received and adopted the motion for a vote of thanks. His services on that occasion had been very slight, but he felt it to have been a very great honour and pleasure to have assisted at the meeting, and he wished most cordially success to an Exhibition which was calculated to have so very material an influence on the health of the country.

The audience then passed from the Albert Hall to the Exhibition galleries.

SOME APPLIANCES AND MATERIALS AT THE MEDICAL AND SANITARY EXHIBITION.

THE exhibition of which we have in preceding columns reported the opening meeting is so large in scope, and contains so many appliances and materials, that we cannot do more this week than notice a portion of the exhibits. The Sanitary Section of the Exhibition occupies the Eastern Quadrant and the Eastern Arcade of the buildings which, with the large conservatory behind the Albert Hall, enclose the Royal Horticultural Gardens on three sides,—the Medical Section occupying the Western Quadrant, the Western Gallery and Arcade, and part of the Albert Hall. For convenience we now deal with the exhibits contained in the Eastern Arcade, beginning at the northern end.

Messrs. Tonks & Son (Stand 242) are exhibitors of a variety of useful door and window fittings, ventilators, and blind furniture, applicable to hospitals and buildings of all kinds.

At Stand 247, Messrs. J. Bolding & Son exhibit a valve-closet with the overflow made to discharge on to the safe, and thence away over an open rain-water head or trapped gulley. Other closets are shown in action by this firm, including Mr. Banner's improved form of pan-closet made entirely of white earthenware, and which can be readily taken to pieces so as to inspect or clean the container, the interior surface of which is, however, flushed each time the closet is used. At this Stand, Messrs. Graham & Fleming exhibit some remarkably good specimens of plumbing work in the form of soil-pipes and traps. With a view to prevent syphonage of closet-traps where more than one closet is connected to an upright stack of soil-pipe, the latter is bulged so as to considerably increase its diameter at each point where a branch or arm from a closet enters it.

Mr. G. E. Pritchett, F.S.A., architect, exhibits at Stand 248 his patent hot-water system for economising heat and fuel. Corrugated double metal plates are formed with an interval between them for the circulation of water. These plates have a large heating surface, and as they occupy very little space compared with round pipes, they can be fixed without inconvenience behind dadoes and in other positions where pipes would be inadmissible. A full-sized section of the wall of a room with Mr. Pritchett's method of warming and ventilating applied is exhibited in action, and will repay examination by visitors. Mr. Pritchett claims to obtain a *maximum* of warming power, while reducing the expenditure for fuel to a minimum.

Messrs. Thomas Waller & Co. (Stand 249) exhibit a water-closet fitted with an inner pan rim for the prevention of draughts. The space beneath the seat is ventilated, and when the inclined lid is shut down, the pan itself is ventilated into a flue passing up through the wall. This firm are also exhibitors of grill apparatus for chop-houses and hotels, gas-roasters, and other cooking apparatus, including a 9 ft. 6 in. close range. Ventilating and warming appliances are also a specialty of this firm.

Perhaps the largest space occupied by any one exhibitor is that which has been secured by Messrs. Steven Bros., who at Stand 250 display a fine collection of ranges and cooking apparatus, embodying many great improvements, and eminently worthy of the attention of architects and proprietors of large establishments. This firm's Roman bath, in cast iron, enamelled, finished on the outside so as to render casing-in unnecessary and undesirable, is also shown by them.

Messrs. Walter Macfarlane & Co. (Stand 251) have a notable display of goods in cast-iron, including a circular urinal of new and ornamental design, "silverised" screens for various purposes; drinking fountains and horse and cattle troughs of ornamental design; trough closets; and ornamental lamp standards.

The Briton Ferry Coal and Pottery Company (Stand 252) send from South Wales some very good stoneware pottery for sanitary purposes.

Messrs. Doulton & Co. (Stand 253) have a good display of sanitary appliances, including their patent "Vacuum" water-waste preventer, "Lambeth Flush-out," "Lambeth Valve," "Lambeth Trapless," and other closets, and bath and water fittings. They have also a good show of their now celebrated Doulton ware, both in its more purely ornamental forms, and as applied to lavatories and other sanitary fittings, and a quantity of architectural terra-cotta and Lambeth faïence. Everything on this Stand will bear examination, and sustain the reputation of the firm.

Messrs. Beard, Dent, & Hellyer (Stand 254) exhibit their "Vortex" and "Artisan" closets, Hellyer's intercepter trap, water-waste preventers, housemaids' sinks, valve-closets, water fittings, and good specimens of plumbing work.

Hard-burnt architectural terra-cotta work of good colour, sharpness of line, and excellence of texture; also specimens of the "Lambeth majolica," are shown in variety by Messrs. James Stiff & Sons (Stand 255). This firm are also exhibitors of a large assortment of sanitary pottery, including Soper's "Hospital drain-disinfecter," as used at Stockwell Small-pox and Fever Hospitals, and elsewhere; Weaver's "Ventilating sewer-air trap;" Stiff's "Inter-

ɔpter" sewer trap; and the "Weatherly disconnecter waste-water trap"; together with a double form of the latter, just devised, and called the "Weatherly disconnecting and ventilating drain-trap," which they claim to be the "latest and best" sewer-trap. In it the requirement of disconnection is met by means of two entirely separate water seals at different levels. It should be looked at by visitors.

Messrs. J. Tylor & Sons (Stand 256) make a display well worthy of their reputation. Among their exhibits we may particularly specify their slop or housemaid's sink, with flushing-rim, as used at St. Bartholomew's Hospital; their lavatory-basin, with back outlet and flushing-rim inlet; their patent "Waste not" valve, as fixed for the Corporation of London in several of the courts and alleys of the City, and which only supplies one pailful of water at each movement of the valve; and their automatic district water-meter.

Stand 257 is tenanted by that pioneer of inventors and manufacturers of modern sanitary appliances, Mr. George Jennings, who, it need hardly be said, shows many good things. Besides closets of various kinds, he exhibits in action his patent automatic flushing apparatus for urinals and other purposes; also his patent ball-trap and bath supply and waste. A notable exhibit at this Stand consists of a number of the Du Bois drawn-lead traps, in various forms. These are American products, and well merit the attention of English architects and plumbers.

At Stand 258, Messrs. Robert Boyle & Son make a good display of their well-known and long-tried "air-pump" ventilators. Among many buildings in which their system of ventilation has been successfully applied is the London Custom-House, and some experiments to test the power of the ventilators applied there were not long ago recorded in our columns.

Messrs. Edward Brooke & Sons (Stand 259) exhibit their patent ribbed drain-pipes, which have ribs flush with the outside face of the socket, running longitudinally the whole length of each pipe. The object is to secure strength, to prevent breakage of the socket, and to facilitate laying. The same firm are also exhibitors of a variety of sanitary pottery, including Kirk's "Combined Double-ventilating Sewer-trap and Slop-dish," the invention, we believe, of an architect.

Mr. W. P. Buchan (Stand 261) shows his improved patent drain-pipes, each pipe being made with a small attached block or seat moulded with and forming part of the faucet or socket end. This block is flat at its base. The use of it is that it raises the pipe sufficiently to allow the hand or tool to pass easily beneath the pipe, so as to facilitate the making of a proper joint. Mr. Buchan also shows his ventilating drain-trap, and his "induced current ventilating cowl" for soil-pipes, &c.

At Stand 262 is shown the "Shrewsbury" closet, the invention of Mr. William White, F.S.A., architect. It is provided with special and novel means for securing efficiency of flush, and has previously been described by us.

At Stand 263 Mr. Edward Warner shows a good syphon disinfector for water-closets. The syphon-pipe leading from the reservoir containing the disinfecting agent has one end connected with the pipe that supplies the closet with water, and the passage of the water through the supply pipe causes a vacuum in the syphon, and leads to the discharge of a measured quantity of disinfectant.

The Banner system of sanitation is fully illustrated, both by drawings, models, and the actual appliances used, at Stand 264. Mr. Banner also shows a working model of his proposal for ventilating the Underground Railway. How greatly the ventilation of that line is needed will be known to those who are obliged to travel by it, especially during the present hot weather. Mr. Banner proposes to divide the up and down lines by enclosing them in tubes or cases of sheet metal, and to affix to the engine in front of the driver's footplate, but in the rear of the chimney, a disc or screen nearly the full size of the space enclosed for the line, the idea being that the screen will drive before it all or nearly all of the suffocating fumes given off by the locomotive.

Messrs. W. Ingham & Sons (Stand 266) exhibit a chimney-piece constructed of glazed terra-cotta bricks of ornamental design. This method of construction ensures cleanliness and cheerfulness of appearance, and can be readily adapted to any width of opening. Brown's patent "Accessible" syphon-trap, shown by the same firm, has also a movable lid or cover over the upper part of the trap, giving ready access not only to the trap on the outlet side, but to the drain into which it discharges. McLandsborough's double-trapped ventilating gulley for house and surface drainage is made and exhibited by the same firm. Both these traps are made of salt-glazed stoneware. Another specialty shown by this firm is Adams's "Automatic Trough Flushing Closet," which is made of glazed fireclay, and the contents of which are discharged by automatic syphon action. Some very good terra-cotta chimney terminals are shown at this stand.

Mr. D. T. Bostel (Stand 268), besides exhibiting his improved "Brighton Excelsior" water-closet, shows a new thing in the shape of Hoit's patent pneumatic flushing cistern and water-waste preventer. It contains no valve, but is discharged by means of bellows which are compressed by the pulling down of a chain or lever and exhaust the air in a syphon, thus creating a vacuum and allowing the water in the cistern to be discharged.

Messrs. Thomas Smith & Co. (Stand 269) exhibit Herbert Jones's patent drain-pipes and junction caps, and a variety of other sanitary stoneware, including Palmer's gulley and disconnecting trap, in which provision is made to utilise the rain-water falling on the roof of a house as an additional means of flushing the trap, the down-pipe being carried into the drain on the inlet side of the trap. Messrs. Smith are also exhibitors of pottery for chemical purposes, and of terra-cotta chimney terminals.

Messrs. Joseph Cliff & Sons (Stand 270) are exhibitors of some specialties in sanitary pottery, including terra-cotta sinks and baths enamelled inside, and mangers and troughs for cattle, sheep, and pigs. Whether intended to be used by man or beast, nothing can be more cleanly than these articles. This firm also exhibit in great variety architectural terra-cotta, majolica, and faïence; and damp-proof courses and similar necessary adjuncts of a healthy habitation.

The Birmingham Sanitary Association (Stand 271) exhibit Potts's "Edinburgh" air-chambered sewer-trap, which has many good points. It has, we believe, been adopted for use by the Birkenhead and Bolton Corporations, and by many local boards, for use in their public buildings.

Mr. J. E. Ellison (Stand 278) exhibits his conical-perforated bricks and air-grates for ventilation, several times previously noticed by us as a good means of admitting air to rooms without draught. A modification of the same appliance is shown in Mr. Ellison's patent air-diffuser, which admits the air into a room through a grating in the outer face of the wall. Sliding in and out of the opening made in the wall to receive the grating, there is a wooden trunk or box, open at the back, opposite the grating, and admitting fresh air into a series of wedge-like chambers formed between two circular plates of wood or other material by radial divisions. The front of this apparatus, facing the interior of the room, may be made to assume the form of a mirror or decorative medallion.

Messrs. Wilcock & Co., of Burmantofts, Leeds, exhibit (Stand 279) their "Sanitary Trough-closet" (Holroyd's patent), admirably suited for situations where anything less simple would get out of order by reason of rough usage. It need hardly be said, however, with regard to trough-closets, that the caretaker who has charge of the keys of the valve-chest should be a person who can be relied upon to flush out the troughs at stated intervals. The same firm are exhibitors of a variety of sanitary pottery, including a stoneware street-gulley, as used by the Leeds Corporation. They have also a good show of majolica and faïence adapted for architectural work.

The Thames Bank Iron Company (Stand 280) exhibit their improved base-burner gill-stove and other stoves for warming by hot air; also saddle-boilers, coils, &c., for warming by hot water. Their laundry roof, with gear for ventilating, is simple and handy in contrivance. Such articles as sluice-valves, manhole-doors and frames for sewers, gulley grates, &c., are exhibited at this stand in profusion.

Messrs. Shanks & Co., of Glasgow (Stand 281), exhibit baths and bath-fittings, including a very convenient sitz-bath of, we believe, American device. This firm's specialties seem to be valve and other water-closets, housemaid's sinks, lavatory basins, &c., in earthenware, encased on the exterior with iron to diminish liability of breakage.

Messrs. Maguire & Son, of Dublin (Stand 282), exhibit their patent "safety-joint" drain. The drain-pipes are of ordinary salt-glazed stoneware, each alternate pipe having an inspection cap or cover, which enables the workman or the supervisor of the work to satisfy himself beyond doubt that no cement forced up into the pipes by the insertion of the spigot into the socket to make the joint is left inside the pipes to impede the flow of sewage. Security from danger to the joints externally is afforded by the stoneware "cradles" in which the lower halves of the socket-joints rest, the space in the "cradles" not occupied by the pipes being filled up with cement concrete, completely enveloping the lower halves of the joints, the upper halves being afterwards cemented over on the exterior. By these means a very strong and perfect joint is secured. The same firm's patent self-flushing tank is shown in action, and should be seen by visitors. Among other of their exhibits we have only space to mention their "improved safety disconnecting receiver" for bath-wastes, their portable and fixed disinfecting apparatus for hospitals and other institutions, their patent renewable water-filter, and specimens of "Anti-corrodo" (Barff's rustless) tubes and fittings.

The Shone Drainage, Sewerage, and Water-Supply Company (Stand 284), show their hydraulic and pneumatic sewage ejectors. They are the inventions of Mr. Isaac Shone, C.E., and have been applied at Wrexham. We understand that sewerage works upon this principle are in course of construction at Eastbourne and Winchester. The apparatus, which is shown in the Exhibition by working models, is also applicable to purposes of water-supply. A flushing-tank, the syphon of which is started by an automatic tipping basin (the invention, we believe, of Col. Jones, V.C.) is also shown in action.

Mr. J. Charlton Humphreys, besides exhibiting (Stand 285) specimens of corrugated galvanised iron as applied to the construction of temporary hospitals or other buildings, has been entrusted with the work of enclosing the northern portion of the western arcade for the use of the Medical department of the Exhibition.

The Sanitary Engineering and Ventilating Company (Stand 286) are exhibitors of the "Imperial" vertical tubes and other appliances for ventilation, and of their method of "house drainage on the air-flush system."

The Silicate Paint Company (Messrs. J. B. Orr & Co.) exhibit (Stand 287) their non-poisonous paints and colours, including "Charlton white," oils, pulp-colours for paper-stainers, silicate paints and enamels, and silicate distemper,—which possesses the sanitary merit of being washable. It can be executed in any design or colours.

Messrs. Frederick Walton & Co. (Stand 288) exhibit specimens of their "Linerusta-Walton," a decorative material for walls, &c., which has more than once previously been noticed by us with commendation. While capable of an infinite variety of treatment in design and colour, it has important sanitary merits.

The Sanitary Paint Company (Griffiths, Berdoe, & Co.), (Stand 289), are exhibitors of sanitary and enamel paints and petrifying liquids. Among their specialties may be mentioned silicate distemper (washable), Griffiths's vermilion, stated to be about half the price of ordinary vermilion, and not liable to fade in the sun; "Stegonite," a cheap paint in all colours for iron and metal work generally; and Griffiths's zinc white, a desirable substitute for white lead.

The Albissima Paint Company (Stand 300) show their "Sanitary Paints," made from zinc. It is claimed for them that they are absolutely non-poisonous; that their covering power is from 25 to 50 per cent. superior to the best white lead; that they are durable and unaffected by impure atmosphere; and that they are very easy of manipulation. This paint seems to be a good material.

Messrs. Candy & Co., of the Great Western Pottery Works (Stand 301) exhibit, among a quantity of sanitary salt-glazed stoneware, the "Registered" sewer-gas excluder, with double water seal. This is a very useful disconnecting trap. The "Chudleigh" soil-pipe trap and sewer ventilator, for fixing at the bottom of vertical soil-pipes; and the "Mason's Trap," a substitute for the old-fashioned brick and cement trap, with inspection hole and ventilating opening, are also among the exhibits of this firm, who also show damp-proof bricks of stoneware and terra-cotta, with vitrified and salt-glazed

surfaces. These combine great usefulness with comparative cheapness.

Messrs. John Finch & Co. (Stand 302) show their "Royal Porcelain" bath, made in one piece of fire-clay, with *bisque* glaze on the interior. For cleanliness nothing can surpass it. The same firm are also exhibitors of bath fittings, porcelain sinks, ventilating drain-traps and pipes, glazed bricks for sanitary and other purposes, and of a self-acting water-closet flushed by the movement of the seat.

Messrs. John Bryden & Sons (Stand 303) exhibit a variety of useful inside and outside blinds, and some improved fittings for facilitating the opening and closing of the same. This firm are also exhibitors of wire hung and electric and pneumatic bells and indicators, apparatus for opening window-sashes, &c.

Mr. A. T. Angell exhibits at Stand 304 his patent air-tight cast-iron sewer flap.

Mr. Henry Seward, F.C.S. (Stand 305), shows full-sized models, and specification and drawings of his patent "Disinfecting Vaporiser" as applied to street-gullies, water-closets, &c. The apparatus consists of a vessel to hold a supply of carbolic acid or other volatile disinfectant, so protected as to prevent water passing into such vessel, but allowing the vapour of the disinfectant to freely and continually escape. As applied to a street gulley the vessel to contain the disinfectant takes the shape of a narrow trough surrounding the upper part of the gulley hole, and protected from the influx of water by being placed under the shelter of the framework of the grid. As applied to D or syphon-traps of water-closets, a similar gallery or trough is provided to contain the disinfectant just at the entrance of the closet pan or basin into the trap. As applied to a pan-closet it consists of a small box or chamber attached to the upper part of the interior of the container, a vertical pipe being led up through the top of the container to the level of the seat for the purpose of replenishing the box when needed.

Mr. Edward Howard (Stand 306) exhibits the improved "Duplex" lid and automatic flusher for water-closets, adaptable also to housemaids' sinks, lavatories, urinals, &c. The apparatus is the invention of Mr. H. Saxon Snell, architect. The lids or covers are so contrived that when shut down the water-closet pans, the sinks, or the lavatory-basins, as the case may be, are completely shut off from the house, and a flue is provided to convey away any effluvia which may arise from them. The action of shutting down the lid, in the case of a water-closet, empties and flushes the apparatus.

Mr. Frederick Dyer (Stand 307) exhibits his arrangement for preventing kitchen-boiler explosions. The chief feature of the system consists in the substitution of an upright cylinder, placed near the boiler (say in one of the recesses by the side of the kitchen chimney-breast) for the usual hot-water circulating apparatus. The boiler, which for greater economy of fuel and rapidity of heating is made with tubes running through it from the fireplace into the flue, is of course in connexion with the cylinder, and has an ordinary flow and return. From the top of the cylinder, and also from the boiler direct, the hot-water is caused to circulate throughout the house and back again to the boiler. Mr. Dyer also shows a tidal trap-valve for sewage outfalls. It consists of a solid india-rubber ball, suspended by a hinged lever somewhat in the manner of an ordinary plumber's ball-valve, and which, on the influx of the tide into the outlet, is made by the pressure of the water to impinge tightly against a gun-metal seating.

Mr. John Parker (Stand 313) shows his self-acting dry earth-closets in various forms. Either earth or ashes can be used with this apparatus, and provision is made for separating the liquid from the solid matters.

Mr. J. R. Pickard (Stand 315) is an exhibitor of a domestic fire-grate intended to consume its own smoke and to prevent down-draught, a concomitant advantage being, of course, economy in the consumption of fuel. The only outlet into the chimney is through a movable perforated fire-back, which may be of iron or fire-clay. A damper is provided for regulating the draught to any required degree. The inventor claims that this arrangement is applicable to all existing furnaces, stoves, and ranges. It is, of course, intended to burn any kind of coal. The same exhibitor shows a model of his patent tubular atmospheric smoke-consumer as applied to boiler furnaces, and a model of his "Gormand" furnace for consuming by "cremation" town refuse of all kinds. An ash-closet and a carbonising oven are also shown by him.

Mr. Alfred Shaw (Stand 316) exhibits a "self-contained mechanical dry closet, requiring no water-flush." It is made entirely of metal and earthenware, and is very costly, and we are afraid that its costliness will not be compensated for by its efficiency.

Moule's Patent Earth-Closet Company exhibit at Stand 317 their earth-closets and commodes in a variety of forms and materials.

At the Journeymen Plumbers' Stalls (320, 321, 322), which were not complete at the time of our visit, and particulars of the contents of which are not contained in the first issue of the official catalogue, several working members of the plumbing craft have sent in specimens of what they have been able to do in competition for the prizes offered in connexion with Mr. Hellyer's lectures under the auspices of the National Health Society. The specimens of work vary somewhat in execution, but many of them are very good. Mr. S. Fairchild, a journeyman plumber, exhibits a design for a system of sanitary plumbing applicable to a town mansion. He would place all the water-closets and other offices in a separate wing or tower, separated from the main building by double doors forming a lobby, giving cross-ventilation to this lobby by means of windows on each side of it. All soil and waste-pipes are shown trapped, ventilated, and disconnected from direct connexion with the drain.

Mr. James Woodward, of Swadlincote (Stand 323), shows his patent wash-out closet, which is simple and effective. He also exhibits a very useful "wash-up" sink, consisting of a basin with a corrugated surface or slab, on which to place cups and other vessels to drain after being washed.

The Antiseptic Apparatus Manufacturing Company exhibit in action at Stand 324 their simple appliance (of which we have spoken favourably on previous occasions) for preventing foul smells from water-closets. It can be easily fixed to any kind of water-closet.

Stand 325 is occupied by Messrs. Smith & Barnes, who exhibit a system of joint-making in plumbers' work without the use of metal pot and irons.

Mr. F. G. Underhay (Stand 326) exhibits valve and other closets and water fittings in great variety, and of a quality fully sustaining the repute of the exhibitor.

Messrs. C. H. Sharp & Co. (Stand 327) show a combination water-closet, slop-sink, and urinal, and, among other things, their "Crown Ejector" ventilator.

At Stand 328 Messrs. Ihlee & Horne have a dark room in which they show the luminosity of Balmain's patent luminous paint, as applied to, among other purposes, hospital ward ceilings.

Messrs. Hayward Tyler & Co. (Stand 329) show among their specialties a new form of closet, named by them the "Full-Flush Valveless Closet," which is virtually a greatly-improved form of hopper-closet, with very superior means of flushing. The basin closely resembles in shape that of a valve-closet. This closet can be fitted in the space occupied by any pan-closet. The same firm exhibit several other things worth attention.

Mr. Henry Owen (Stand 330) shows his new patent trapped urinal, slop-sink, and lavatory combined. When not in use the urinal is concealed. The lavatory-basin is made to tip-up and discharge through a spout at the back into the urinal. The same exhibitor has on view his double-trapped and single-trapped water-closets, and his gully and fat-trap combined.

Messrs. John Warner & Sons (Stand 333) exhibit water-closets in great variety. A portable water-closet or commode shown by them has many good points to recommend its use in the sick-room. This firm also show a public water-closet, and self-acting water-waste preventer; a pan-closet with an earthenware container; and bath and water fittings of excellent construction. Visitors not yet acquainted with it should inspect a very valuable appliance made by this firm, viz., Randall's patent boiler safety-valve and tap, the general adoption of which would, we believe, prevent many a disaster.

Messrs. Bowes Scott & Read (Stand 340) show in action a self-acting flushing-tank or chamber, fitted with Mr. Rogers Field's patent annular syphon. It appears to thoroughly fulfil its purpose.

Messrs. Henry Sharp, Jones, & Co., of Poole, Dorset (Stand 341) are exhibitors of their well-known "Rock Concrete" tubes for sewerage purposes. They also show glazed stoneware pipes (fitted with Stanford's patent joint), and other sanitary goods, such as traps, gullies, &c.

At Stand 342, Purnell's syphon water-waste preventer is exhibited in action.

Messrs. Steel & Garland (Stand 346) have a good display of slow combustion and other grates, notable among them being the "Wharncliffe" patent warming and ventilating grate, which has lately been improved so as more readily to permit of the cleaning of the flue when anthracite coal or other smokeless fuel is not burnt in the grate. This firm are also exhibitors of fenders and fire-irons, tile-hearths, and mantelpieces in oak and marble.

Messrs. H. Braithwaite & Co. (Stand 347) show their patent syphon for water-closet and urinal cisterns, Claughton's patent stench-traps, and a "wash-out" closet.

We shall next week speak of the sanitary appliances and materials exhibited in the Eastern Quadrant.

HOSPITAL AND OTHER PLANS AT THE SANITARY EXHIBITION.

WE naturally turn, in the first instance, in making some notes at the International Sanitary Exhibition, to the department in which plans of buildings arranged with a view to sanitary conditions are exhibited. These are to be found in the upper floor of the Western Gallery, around the room in the centre portion of which are exhibited various classes of surgical instruments. There is, therefore, in this department something like an attempt at classification, though this does not extend to the catalogue even here, as the titles and descriptions (where there are any) of the plans are interspersed with various other matters which are in quite a different part of the exhibition. It is a great pity that more systematic effort at arrangement was not made. It is difficult to know where to find anything in the catalogue when it is seen in the room, and impossible to guess from the catalogue where to look for any object that is mentioned and that we may wish to see. Fortunately, a large proportion of the objects exhibited are accompanied by written or printed descriptions, and in many cases there is a custodian who is ready, in some cases we might say eager, to supply information, and thus it is possible by little and little to extract some of the instruction or illustration which the Exhibition is intended to convey.

The department of plans, however, is worst off and least useful of all in this respect. Architects naturally do not attend to explain their own plans, but there should have been more effort to render the plans self-explanatory. We have a good many plans of hospitals, for instance, many of which present very similar characteristics in general arrangement. Their superiority or inferiority respectively would depend very much on details of construction, ventilation, material, &c., which in many cases are not shown at all. A good many of the plans of buildings erected by Mr. Saxon Snell, for instance, and which we noticed recently in reviewing his book on "Charitable and Parochial Institutions," are hung on the walls; but without some of the detailed descriptions of the means employed to secure ventilation, which we had previously learned from the book, one might have condemned some of the plans as showing a strange indifference to the understood sanitary requirements in the plan of such buildings. A copy of the book, which might have given those who were interested in the plans (such as that of the Holborn Infirmary some further information about the systems adopted, we did notice on a table in another room, far away from the plans which the book illustrates, and among other objects having no connexion with it; and this seems rather typical of the general arrangement of the Exhibition.

We call attention to this point in the Exhibition, because if ever or whenever this kind of exhibition is attempted again, there ought to be a systematic endeavour to illustrate sanitary planning in a proper manner. It is not enough, indeed, it is of very little use, that architects should send general plans to be hung on a wall and looked at. It should be a rule, in inviting contributions to such an exhibition, that architects' plans should not be admissible unless accompanied by detail drawings showing in full the various ventilating schemes, heating apparatus, &c., and giving an intelligible description of the principle and method adopted. Without

such details and descriptions the hanging of the plans is of very little use. They are provided in some cases, but in many they are not, and some of the plans which might be among those of the most importance are so unpractical in their style and manner of delineation that they are nearly worthless for the purposes of the Exhibition, or for enabling the judges to come to any conclusion on their merits. There are plans by M. Tollet, for example, for a hospital at Montpellier, which, however, are not catalogued under his name, but under that of Dr. Mouat. After what has been claimed recently on behalf of M. Tollet's system of hospital planning, some special interest should attach to any illustration of it. But what we find in the Exhibition is only some very minute general plans, so small and so imperfectly drawn that it is difficult even to make out the intention in some parts of them, and quite impossible to understand anything of the detailed arrangements. As far as it is intelligible, it does not appear that the principal blocks are any more isolated or cut off from each other than in many other hospitals on the pavilion system,—indeed, not so well as in some of them in this country, for there appears to be a gallery running past the ends of the blocks, and opening directly on them all in succession. Certain departments for specially infectious diseases are treated as separate small houses, without any communication at all between them; this is the only specialty which we can make out from the plans. But such plans are simply useless for an exhibition of this kind.

The various plans by Mr. Snell, which come first in order on the walls, we have recently commented on sufficiently in referring to his published illustrations of them. The next specimen we come to is No. 57, plans by the Freehold Cottage Dwellings' Company, of workmen's cottage dwellings to be built in brick or in Haughton's patent concrete; six different classes of houses, costing in brick from 150*l.* to 285*l.*, and in concrete from 135*l.* to 255*l.* The plans are not very good; there is space lost in passages, and the water-closets are in too close and confined corners to afford a ready circulation and change of air, and in some of the plans they open from the sculleries, which we quite disapprove of. Another set of artisans dwellings of much superior merit to these, is that numbered 60, by Mr. Rowland Plumbe, for the Artisans, Labourers, and General Dwellings' Company. These are well and economically planned houses, though the architect seems to have had difficulty with his larder; in one set of plans it is deficient in through ventilation, in another set it is specially contrived so as to secure through ventilation, but it is placed in too close contiguity to the water-closet to look quite safe. The exterior of the houses looks well, but evidently owes something in its effect to the prettily-executed perspective drawings; the houses have, however, the appearance of solid and substantial building. Under No. 61 are some plans for three-roomed dwellings for artisans by Mr. Mark H. Judge, providing two separate and distinct dwellings one over the other, each with separate street entrance, scullery, yard, and offices. These we published some time ago. The houses are as ugly as anything could be, but are satisfactorily planned in the main; it must be observed, however, that the water-closet accommodation is on the ground floor for both of them, and that the route to it from the upper house is somewhat roundabout. They might easily have been contrived to have the water-closet in similar position on each floor, which would have been very much better.

Some good suggestions in the way of dwellings for the poor are embodied in the plans by Mr. Lawrence Booth for Manchester and Salford Working-men's Dwellings Company. Mr. Booth adopts small blocks of six houses each, arranged in three stories, the central staircase, which is unroofed, dividing the block in two halves. He recommends small block systems, as they can be adapted to any size of site, by placing a greater or less number together. Each tenement contains living-room and bedroom, with separate water-closet with external entrance; the living-room fireplace is well contrived as an angle fireplace to take up very little room, and to send warmed air into the bedroom, which also has an exhaust-flue at the further corner. The houses are meant for a very cheap class of tenement, at about 2*s.* 6*d.* a week, and they are too small and too close at back, but they may be regarded as successful to a certain extent.

Among the hospital plans, we have one of some importance, for which Dr. G. V. Poore and Mr. Waterhouse appear to be jointly responsible (59), for reconstruction of the University College Hospital on its present site. The plan is stated to have been determined in its character in some degree by the nature of the present site, which in some respects left no choice in regard to arrangement. In the report appended, the authors refer to the opinion that hospital wards should be in one-story buildings, and observe that "this rule might be followed if cost were no object, *and if there were no high buildings in the immediate neighbourhood*," the latter sentence being italicised in the report. We fully agree as to the very great difference in the conditions when there are high buildings already existing contiguous to the site. The advantages of one-story building must be very much neutralised in such a case, but the question then arises why should a hospital be built under such conditions? The principle of the scheme is, we may say, almost as a matter of course, the pavilion system, the building resembling the letter E, the three pavilions pointing towards the open space in front of University College, so that "every part of the building is thus made accessible to what pure air there may be on this space," and the building is so arranged that it should be impossible to pass from one pavilion to another, from one ward to another, or from one story to another, without going into an open corridor. "It might be objected that great inconvenience would thus be caused to those who have to visit the wards; but a doctor visiting the wards of a hospital should regard himself rather as walking from house to house than from room to room, and should be clothed accordingly." The scheme appears to be well carried out in the plans. The only point we are disposed to question is the planning of the lavatory blocks at the ends of the wards, in which the w.c. can only be reached through the bath-room, and is not very well ventilated in its approaches. It is surprising, we may observe, how seldom this portion of hospital adjuncts is really well planned, even in cases when every attention is supposed to have been given to securing the best possible arrangement. Another point in the scheme seems to us doubtful,—the omission of any nurses' rooms in connexion with the wards. The reason given is that when the nurse is on duty her proper place is in the ward, and when not on duty she is better out of the hospital. It seems to us hard on the nurse that, in the course of long hours of duty, she should not have a small space for herself, apart from the general ward, on occasions when she is not at the moment engaged in any ministrations, and the room may surely also be very useful for the orderly bestowal and arrangement of things wanted for use in her work.

Mr. Ernest Turner's plan for the small Fever Hospital at Newton-road, Devon (64), is a thoroughly practical one. There are open corridors with wards at opposite ends, the administration portion of the building opening out of the centre part of the corridor; the wards have a nurses' room and a bath-room, with a bath on wheels, in the centre of each ward block, dividing them practically into two smaller wards. The small blocks containing water-closet and sink are put at the angles of the wards, not obliquely, but so that the corners of the blocks are just sufficiently in contact to give room for passage through, and they are very well planned and isolated.

The plans for the North Staffordshire Hospital, by Mr. B. C. Robins, are not only good in a sanitary point of view, but form also a pretty and effective building in an unpretending style. The windows are formed in bays, V-shaped on plan, with the object of enabling patients in bed to see out of window to some extent; a good idea. The same architect exhibits two or three other plans of buildings of the same class.

The plans for the Salford Union Hospital, by Mr. Lawrence Booth, are evidently suggested by the general disposition of St. Thomas's Hospital, which the architectural treatment to some extent imitates. The plan would have been more satisfactory, in fact, if it had more closely imitated the Lambeth building in having the ground-floor corridors of communication open; in this instance they are closed. The water-closet blocks are at the angles of the wards, placed obliquely. The oblique position has been, however, condemned by sanitarians, as it affords more facility for the communication of fouled air from the window of the water-closet to the ward windows than when the two are in the same parallel line. The ventilation scheme is not very clearly indicated; there are fall-back upper sashes to the windows, there appear also to be inlets at the ground-floor, and there is an extract in the roof from the upper-story ward, but what is the extract from the lower wards is not so manifest.

The plans of the West Herts Infirmary, and the South Devon and East Cornwall Hospital, by Messrs. Coe & Robinson, do not present any special points for comment; they seem fairly good. Mr. Chisholm's plan of the Lying-in Hospital at Madras is a very effectively got up plan, with lots of shading and tinting, but unfortunately attractions of that kind do not help one much in determining the sanitary qualities of a plan. We can see that the whole is largely built of wood and enclosed in verandahs, the first point probably unavoidable, the second in every way desirable; and we can see that the hospital is divided into small wards of four beds each, and we learn from the catalogue that the rooms adjoining each such ward are a nursery and scullery, and that the central block contains the labour wards, and is connected with the other four pavilions by covered ways. There are some indications of a means of screening the patient actually under "the pain and peril of childbirth" from the other occupiers of the same ward; at least, we took certain marks in the plan to be indications of a screen, but may be mistaken. From the small block plan appended, it appears that the latrines are in a separate detached block entirely away from the main building; in hot climates this would, no doubt, be the best arrangement for dwellings for people in health, but it is difficult to understand how this can work for invalids. No details of these or of any other practical matters are given.

The National Hospital for the Deformed, proposed to be erected in Great Portland-street (73), is shown in a very complete set of plans; no architect's name in the catalogue. As a hospital plan in the ordinary sense, it would be deficient in isolation of the various parts, but possibly it is considered that a hospital for the treatment of mechanical ailments only may be regarded in the same light as a dwelling for healthy people. As such cases involve surgical treatment, however, this argument would not hold.

Dr. A. Tripier, a French sanitarian, exhibits one or two sections showing plans for the ventilation of theatres and hospitals. The sections show little or no detail, but are accompanied by brief descriptions. The hospital ventilation is operated by a large central duct or ventilating flue going up through the centre of the floors, with openings into each room. This is the inlet, and is intended to be a descending shaft in summer, with the influx accelerated if necessary by mechanical means (not described), and an ascending shaft in winter, sending artificially warmed air up from below; the extract in both cases is the same, through the outer walls near the floor. To make this act, the mechanical propulsion in summer would be always necessary, we should surmise, otherwise there seems no particular reason why the outlets should not become the inlets, and *vice versâ*. With this reservation, there is a simplicity and an equality of air-service for each floor which seems to recommend it. The sketch by the same exhibitor for the ventilation of a theatre, adopts the principle of influx from the stage, and from over the proscenium, to the centre and circumference of the house; and extract around the circumference by ducts leading to a central extract in the roof over the auditorium. The principle is right as to its general form. There is nothing to show whether propulsion is to be adopted, or merely natural influx; the former would probably give the most successful results, but is costly. There is another theatre scheme hanging at a little distance from this,—that of the Théâtre de la Monnaie, at Brussels,—which is stated to have given great satisfaction to its audiences, in the way of ventilation, for some years; but, unfortunately, the plans explain nothing, in spite of the number of arrows with which they are covered.

Among the remaining exhibits in this department is Captain Galton's large plan of the Herbert Hospital at Woolwich. No details are given. As a plan it is hardly up to the mark in the planning of the latrine lobbies, which are deficient in through ventilation. There is a plan (81) for carrying out Professor Marshall's circular ward system, by Mr. Francis E. Jones, which seems to us superior to Mr. Snell's plan. It places the circular wards at the four angles of a parallelogram, the administrative buildings taking the form of a cross in the centre space, with connecting corridors to the circular wards.

A perspective view of the building is given, which is not ineffective, but wanting in homogeneous character. There are drawings of the Camden Turkish Baths, and of a proposed hydropathic establishment at Bournemouth, by Mr. H. H. Bridgman, which are worth attention, and some views of the interior of the "Roman Bath" at Vienna, which serve to suggest what delightful internal architectural effect swimming-baths are capable of when economy is not a rigidly-enacted condition. Mr. H. G. Brace exhibits (66) section and details of a house, showing a system of ventilation which is at least intended to be very complete, but seems to err on the side of complication in the number of its inlets, and the extraction into the smoke flues is not to be recommended. We will illustrate, and our readers may judge for themselves. An admirable and most practical bit of sanitary illustration is Mr. Turner's small plan (64) of drainage system as applied to an ordinary house, with the manholes of interception shown, and the drains carefully distinguished under various classes by colouring. It is a pity there are not more detail drawings of this sort got up with the same care and finish. A curiosity of the Exhibition consists in the number of sheets of pen sketches contributed by Dr. Bastien, and said to be drawings of apparatus for the Ambulances Parisiennes. A good many of the sketches, however, look like jokes, and scarcely any of them are comprehensible in the absence of any description.

GLASGOW MUNICIPAL BUILDINGS COMPETITION.

THE conditions of the preliminary competition, drawn up, we believe, by Mr. Charles Barry and the Glasgow City Architect, have been published. We have already stated the terms decided on,—a preliminary competition of sketch designs, open to all, and a final competition between not fewer than six and not more than ten selected for the purpose. To each of the selected competitors 150*l.* will be paid towards his expenses. The architect placed first in the order of merit by the architectural assessor or assessors to be appointed for that purpose, is to be employed to execute the new building as architect unless some insuperable obstacle shall arise; in which case the author of the design second in order of merit shall be employed, and so on. The sketch designs are to be sent in by November 30th. Full particulars will be found in our advertising columns. If we have an unknown genius among us, he may now show himself.

PROSPECTIVE LARGE EXPENDITURE BY THE METROPOLITAN BOARD OF WORKS.

THE money bill of the Metropolitan Board of Works, which has just been introduced to Parliament, shows an unusually heavy prospective expenditure. Amongst the sums applied for under the Bill is 9,000*l.* as the cost of the sphinxes about to be placed on each side of Cleopatra's Needle. For the purposes of main drainage and sewerage, 100,000*l.* is asked for. For the re-building of Battersea and Putney Bridges, under the Bridges Act of last session, 760,000*l.* is required; also 34,200*l.* in respect of the new Hackney Commons; whilst 100,000*l.* is asked for in the Bill for "minor improvements" and contributions to local improvements. For parks, commons, and open spaces, 15,000*l.* is wanted; and 30,000*l.* for works in connexion with the Fire Brigade. The large sum of 1,500,000*l.* is also asked for to be expended in street improvements; whilst 300,000*l.* is required in connexion with artisans' dwellings. In addition to these borrowing powers, the Bill asks for powers to advance loans to vestries and district boards to the extent of 200,000*l.*; to boards of guardians 150,000*l.*; to the managers of the metropolitan asylums 50,000*l.*; to the London School Board 600,000*l.*; and to other public bodies 100,000*l.* The actual amount of the Board's borrowing powers provided by the Bill is 4,536,334*l.*

Windsor Castle.—The roof of the Guard-house, containing about 5,000 ft. of some kind of asphalte, is being stripped, and in its place the quality supplied by Claridge's Company will be laid.

TECHNICAL EDUCATION: THE NEW INSTITUTE.

ON Monday afternoon last, with a considerable amount of ceremonial, befitting to so important an occasion, H.R.H. the Prince of Wales, President of H.M. Commissioners for the Exhibition of 1851, fixed a granite shaft of the Central Institution of the City and Guilds of London Institute for the Advancement of Technical Education, the site of which, upon the estate of H.M. Commissioners for 1851, has been granted by the Commissioners to the City Guilds at a nominal rent. Originally the site had been fixed upon that side of the estate which is farthest away from the museums and libraries belonging to the Science and Art Department. Fortunately this obvious error has been corrected, and the students of the new institution will find the South Kensington collections and libraries almost contiguous for reference.

A numerous company, representative of the state, the civic, the scientific and artistic forces engaged in promoting national education, was gathered together to do honour to the occasion. The chief burden of the proceedings was borne by H.R.H. the Prince of Wales and the Lord Chancellor, who is Chairman of the Council of the City and Guilds of London Institute. The two speeches, made by H.R.H. the Prince of Wales and by the Lord Chancellor were, from some points of view, by far the more important of the incidents of the occasion.

Lord Selborne spoke of "the objects of the Institute as being the improvement of the industrial and commercial pursuits of this country, by affording facilities to apprentices, foremen, managers of works, and manufacturers, to become practically acquainted with the principles of science and art in their application to industrial operations." This extended description is reduced in his lordship's next sentence to "a system of education for artisans, intimately associated with the purposes for which some of the guilds were originally founded." In mentioning the earlier labours of the guilds in promoting "technical education," the Lord Chancellor called the object of their labours, "technical science and art," "technical instruction," and "technical education." Some of the instructional work done by the guilds was described by Lord Selborne specifically; such as the application of chemical science to manufactures, and the application of electrical science to the transmission and conservation of energy. At the new Institute, the Lord Chancellor said, it was intended to provide means for imparting to persons engaged in professional or commercial pursuits "a knowledge of some branch of mechanics, physics, or chemistry," which "in its practical application will be found not only serviceable, but almost indispensable," to their pursuits. "Here," he continued, "it is expected that artisans who have shown merit, and have won distinction at the branch or provincial colleges, will complete the training which may qualify them to act as managers and superintendents of works. . . . . Here it is anticipated will be trained that body of technical teachers of whom there is in England at the present moment so great a need, who will carry with them from this College into the manufacturing centres, to be there imparted to other students, a knowledge of the theory and practice of the various crafts and industries. . . . . The aim of this institution will be to supplement the teaching of the excellent schools [of science and art] situate in the neighbourhood, by giving instruction in the practical application of science and art to the trades and industries of the country, and by cultivating and endeavouring to stimulate inventive genius."

To this address his Royal Highness the Prince of Wales replied, and in the course of his speech made the following remarks which bear upon the meaning of "technical education":—"Hitherto English teaching has chiefly relied on training the intellectual faculties, so as to adapt men to apply their intelligence in any occupation of life to which they may be called. . . . . Both in Europe and America technical colleges for teaching, not the practice, but the principle, of science and art involved in particular industries, had been organised in all the leading centres of industry. England is now thoroughly aware of the necessity for supplementing her educational institutions by colleges of a like nature. Most of our great manufacturing towns have either started or have already erected their colleges of science and art. In only a few instances, however, have they become developed into schools for systematic technical instruction."

There can be no disrespect in candidly avowing that it is not an easy matter for any one to obtain a distinct idea of the exact drift of either of these speeches. Both, of their kind, are authoritative, and must have some effect in moulding a public opinion as to the meaning of technical education. A leading theme of the Lord Chancellor's remarks is that a "technical" or "special" course of instruction for artisans and managers of works is required. In an opposite direction, H.R.H. the Prince of Wales is reported to have said that "English teaching has chiefly relied upon training the intellectual faculties," implying thereby apparently that handicraft had been neglected in favour of overburdening Englishmen with intellectual training. Surely as a matter of historic fact, not to say experimental truth, the force of which has raised our manufactures so high in the estimation of the world, the point in which English workmen excel has been soundness and completeness of workmanship. To enable this quality of workmanship effectually to compete with the less solid, but nevertheless at present more remunerative, workmanship of other countries, is no doubt the aim of the so-called "technical educationalist." This aim, in so far as English workmanship or handicraft is concerned, resolves itself very much into one of economy of labour. British handicraft has, it appears, enjoyed its prestige chiefly on account of its extravagance of completeness. Its goodness was wastefully good. These facts modern science has brought to light. Modern science is responsible, therefore, for remedying the defects. But no confusion should exist by which it may be sought to make modern science identifiable with City guilds, or *vice versâ*. The guilds have not kept that watch which would qualify them to receive the accolade for their scientific and educational proficiency. Indeed, they have hardly defined the object of their quest. A principal gist of technical education certainly seems to be to infuse into our workmen a leaven of economy in their expenditure of labour and their employment of material. The very demon of shoddiness, which Carlisle execrated, has perhaps his good economical points; and it is the discovery and dissemination of a knowledge of these good points which English handicraft probably requires. With some such simple idea before them, the managers of the City Guilds Institute may hope to serve the cause of English handicraft. For the present, let them rather shut their eyes to the somewhat Quixotic pretence of being able to train handicraftsmen, and, in a sort of carrying-coals-to-Newcastle manner, of supplying the manufacturing centres with *teachers* (?) of "crafts and industries," as mentioned by Lord Selborne. A course of action for the City guilds who wish to cast off the odium of a longish series of extravagant banquets, and to return to an intelligent interest in their various trades, is traced in a perfectly straight direction by the finger-post, "economy in labour and material." This means providing handicraftsmen with thorough instruction in certain fundamental scientific principles which experience has shown can affect the processes of their labour and the materials of their use.

With no desire to unduly disparage what the City guilds have already done, we can safely affirm that the chemical lectures and laboratory practice at Cowper-street Schools, the metallurgical lectures at King's College, the art instruction at Lambeth, are not distinguishably different from chemical lectures, laboratory practice, metallurgical lectures, and art instruction given under the auspices of the Government Department of Science and Art. As to the technological examinations, through some unfortunate little fit of jealousy, the City guilds made an initial mistake when they undertook to take them over from the Society of Arts, by altering their plan, which had been carefully devised by the highest scientific authorities. It is certainly to be hoped that the City Guilds Institute may, as Lord Selborne said, supplement the teaching given in the Training Schools for Science and Art under the Science and Art Department. But how or when this may be expected, when at the onset the City guilds have had the temerity to reject the highest scientific advice, it is hard to say. Nevertheless, time works wonders, and between last Monday's ceremony and the opening of the South Kensington laboratories, lecture-hall, theatres, and classrooms the "Divinity that shapes our ends,

rough-hew them as we will," may have led the managers of the Institute to see the technical wisdom of taking the advice which experience can offer them; as well as the non-technical and extravagant futility of contentedly believing that the blind can lead the blind.

WINCKELMANN.

WINCKELMANN'S is a name which, for more than a century, has borne with it the respect of the world,—a respect paid to it quite as much, we suspect, on reputation, as on familiarity with his books. Since the publication of the great German's works, the researches of later students have gone far to render somewhat antiquated his views. We know that with all the enthusiasm and earnestness he possessed,—so necessary a quality in studies of this nature,—the funds of information at his disposition were limited; we know how many elements in the development of the history in which he was so interested were unknown to him; we know that writers who have succeeded him are now set aside by reason of the advance that the science of archæology has made within this century,—since, in fact, he himself gave the first great impetus to the study. But still the reputation of Winckelmann stands foremost among the names of those who have searched antiquity for the lessons it may teach. We respect as we do in his great predecessor, the learned Benedictine Montfaucon, the enthusiasm that he showed in his pursuit, but we feel unconsciously that he belongs to a time gone by, that his views are those of another age; we have, in fact, accepted his reputation, we look upon him with the respect that is due to an ancestor.

In the present day, when art, artistic admiration, and art-criticism are made so much an affair of fashion, and even of *cliques*, or, to use a more English word, of "sets," every true art-lover must welcome any effort made in a direction which will tend to widen the somewhat narrow views which,—must it be owned?—we in this country seem destined to take of art. Never should we lose sight of our admiration and emulation of Classic art, the efforts of its masters, their results and teachings; no narrowness of view can possibly result from our study of their beauties, beauties which Winckelmann was, if not the first to appreciate,—the Renaissance artists had long before his days worshipped their Classic predecessors,—the first at least to explain, to reason upon, and endeavour to analyse. We who admire and strive to rival the art of later centuries admire but a dilution of those noble beauties so much more easy to emulate than the original to which in the midst of our ever-shifting fashions the allegiance of the cultivated has never swerved. Something more, therefore, than a mere conventional expression of gratitude is due to the student who again draws before the outer world the lesson of admiration for Classic art, the only true and never deviating standard of all art-teaching, of all art-criticism, of all art-education.

It is, we consider, a fact worthy of notice that the recent publication by a London firm of a translation of Winckelmann's famous "History of Greek Art" comes to us from America. America has been forcing itself rather pertinaciously on the attention of the Old World of late, though in ways generally unconnected, it must be admitted, with the arts. The entrance of our cousins in the field of archæology is noteworthy, for the publication of such a work as Winckelmann's "History of Ancient Art" enters almost solely into that province. The name of the translator, Mr. Lodge, it is true, has been connected with the English translation ever since 1849, when, if we mistake not, the first edition of the work was published by him at Boston, and at London a year later. But until Mr. Lodge undertook the task no English translation of Winckelmann's great work existed, a fact which, when we consider the reputation of the author at the commencement of this century, cannot be said to speak highly in favour of the interest of our public in archæological matters. In France, scarcely had the original edition of the work appeared (1764) than a French translation,—it is true not a very correct one,—was published, and in library catalogues mention will be found of no less than three separate French translations of the work which threw such a new light on the study of the artistic remains of antiquity.

The publication of the "History of Ancient Art" marks, as has been truly said, an epoch in the annals of human thought. A theory of the beauty of Greek art was for the first time satisfactorily laid down,—the development, zenith, and decline of this art for the first time shown in connexion with historical and literary data. With the elements at his disposition, scant as we know them to have been, Winckelmann's history, as a history, is to us now of small use; the whole realm of Greek art since those days has been subjected to a study supplied with data of which Winckelmann was totally ignorant. Phidias and the work of the great school of Ægina which preceded the sculptor of the Parthenaic marble was known but by name to the curator of Cardinal Albani's collection; his eyes had never rested on the glories which now repose in the British Museum; Ægina and its temple treasures still lay buried; the Phigalian marbles were to Winckelmann unknown, the Venus de Milo, the temple of Olympia, the vases that fill our museums, the strange sculptures of Selinonte, the temples of Asia Minor, and, within more recent years, that whole store of information respecting Assyria, Phœnicia, and Egypt, not to mention Cyprus, which we owe to English, German, and French archæological zeal.

Winckelmann and his conjectures have long been left behind, and many an antiquary who has succeeded him; but our debt of gratitude must never be forgotten to the earnest scholar who first analysed in their artistic bearings the monuments of ancient art, who founded the modern science of æsthetic study, so different in its essence to that sickly product of morbid conceit so justly satirised at present in artistic quarters.

Winckelmann's "History of Ancient Art" must not, therefore, be looked upon as a history; his great work may be said to consist rather of a theory of plastic beauty,—the beauty of nature such as the Greeks interpreted it. The task he had undertaken, in the midst of the frivolity of the last century, was one the difficulty of which we of the present generation can little understand. It is true he was assisted largely by the spirit of reaction that had set in; the decorative simplicity of classic life had been singularly revealed to the artistic world by the discovery first of Herculaneum and then of Pompeii. The age was an age of literary antiquaries and patrons; but their services had remained more strictly confined to the enumeration of the classic treasures then in existence. It remained to Winckelmann to see this world of beauty in a new light, to analyse and compare its developments, and, having lingered over its details, to reveal the theory of its charms in language inspired by the noble artistic sentiments of the master-critic, Plato, expressed with the warmth of an enthusiasm which was till his day unknown to the literature of antiquarianism. Winckelmann's views were at once accepted; and if at first in the author's native country he was not immediately successful, he lived to see all opposition overcome. In German literary and artistic annals no name stands higher than that of the industrious struggling schoolmaster who rose to the proud position he occupied at the moment of his tragic death.

The life of Winckelmann has been on many occasions told and re-told. No life is more truly illustrative of the success that ever waits the efforts of well-directed labour. Nothing more clearly proves the heartfelt devotion of the young student to his pursuit than the sacrifice of his Protestant principles to attain his end, which, as he clearly saw, could alone by this means be effected in a court like that of Rome. Once at the goal of his desires,—though he did not reach the Eternal City until he was thirty-eight years of age, 1755 (he was born in 1717),—he threw himself with passion into the study of the productions of the great people with whose literature he had made himself already so familiar; guided by the dictates of a cultured mind, his appreciative and critical powers were singularly developed in this atmosphere in which, as he remarked himself, he should have been born.

Composed of six books, Winckelmann's "History of Ancient Art" embraces the whole field of information possessed by the archæological world of four generations since. The art of the principal nations of antiquity, the Phœnicians, the Egyptians and Persians, the Etruscans, the Greeks, and, finally, the Romans, is passed in review. Art, as the author shows, is but the expression of a need, and as the oldest of these expressions he places sculpture, a view which it can be seen admirably suited the theories he was desirous to expose; sculpture taken as the earliest of the arts, its rise and development are told; Greek mythology discussed; the powerful effect of climate. In his review of Egyptian art it can be understood how meagre was the information at the writer's disposal a century and more since; even more meagre is his sketch of the art of Phœnicia and Persia, anxious as he is to arrive, after reviewing Etruscan art, at his favourite theme, the art of the Greeks. Here we meet with his enthusiasm; all the political and other reasons which gave to the Greeks such supremacy are enumerated by our author with burning enthusiasm,—their freedom, their lovely climate, their physical and mental education, their cultivation of beauty, that strange and mysterious quality, an exact or even general definition of the essentials of which must, as he himself truly remarks, be classed among the truths yet undiscovered. But the expression of this beauty as depicted by the Greeks he seeks and well describes, among the gods and goddesses, learnedly and gracefully explaining the descriptive epithets which the Greeks so skilfully attached to each of their divinities. We next enter into the subtle depths of expression, proportion, and composition; a book is devoted to a lengthy and comprehensive consideration of the details of the human body as treated by the Greek artists; the tale of the decline of Greek art among the Romans closes the work.

It will be seen that Winckelmann's "History of Ancient Art" forms, as has been said of it, a vast encyclopædia of the arts of design, in which were expressed a number of views that to the critics of the last century were essentially novel. It cannot be denied that Winckelmann is not unoften curiously influenced by the spirit of that century, but, when we consider the age in which he lived, we must thank the earnest student who was able boldly to controvert so many erroneous theories current in his day. Winckelmann's "History," in fact, in spite of all that has since been written and discovered, remains essentially a classic.

To his other works scarcely less interest is attached; of his "Monumenti Inediti," published in Italian (Rome, 1767), it may be said to have done even more than his "History" to give him his position in the learned world. But the "Monumenti Inediti" is much less known than the "History"; in its pages, however, he may be said really to have established the fundamental principles of modern criticism for the interpretation of the monuments of classic antiquity,* and to have shown the world that it was not in Roman history, as was the case in his day, that was to be sought the explanation of the artistic relics of classic times, but in Homer and the traditions of Greece.

The impulse given by Winckelmann to antiquarianism was immense; a new spirit was imparted to the investigations henceforth conducted. Since his day how many names are there not which deserve mention in the great field in which he toiled so lustily, before him how few? Montfaucon, that epitome of Benedictine patience, stands out foremost, but he lived a century too soon; as for the Abbé Barthelemy,—the author of that fund of classic information, the *Voyage du Jeune Anacharsis en Grèce*,—he was Winckelmann's contemporary, like the industrious and earnest, though scarcely profound, amateur, the Comte de Caylus. But after Winckelmann the list grows. Piranesi's bold needle did its best to acquaint the world with the art of Greece and Rome; in this century, Thiersch and Meyer are names in Germany hallowed in the annals of archæology, Müller in his Handbook—well translated into English by Leitch — Gerhard and Welcker, Starke, and Kügler, and his still living active continuator, Lübke; in France, the Comte de Clarac, Seroux d'Agincourt, Beulé, Perrot, and a host of others; in England, a list whose names are familiar in our mouths as household words, Professor Cockerell, Layard and Rawlinson, Leake and Falkener, Fellows and Newton, Birch and the veteran Professor Donaldson, and many another. Times have somewhat changed since the day when poor James Millingen could scarcely find in England ten subscribers for his "Ancient Unedited Monuments" (1822), when the doors of the collections he sought to illustrate and make known were pitilessly closed to him, and he was forced abroad, where he received an enthusiastic welcome.

For this change we have, in great part, a debt of gratitude to pay to Winckelmann, by whose

* Vinet, "Bibliographie des Beaux Arts," Paris, 1874.

writings was spread more widely that taste and cultivated admiration for true art that has led in our day to such gigantic creations of but a few generations as the British Museum, the National Gallery, and last, not least, the South Kensington Museum; for Winckelmann's admirers claim for him not merely the credit due to the patient archæologist; biographers such as Mr. Lodge point to his influence for good as "a great philosophic teacher of the beautiful and grand in plastic art." Such, we must all agree, is praise that Winckelmann deserves; indeed, we are daily served with diluted Winckelmann, but that he still remains "the most trustworthy, instructive, and delightful of the masters on art," is a statement which, while it is excusable in the belief of his excellent translator, can scarcely be accepted,—in all due reverence, be it said, to Winckelmann's sacred memory,—without a wholesome reserve by the modern student of æsthetics.*

BUILDER'S MACHINERY AT THE ROYAL AGRICULTURAL SOCIETY'S SHOW, DERBY.

THE Royal Agricultural Society's Show, which was opened in Osmaston Park, Derby, on the 13th inst., contained, as usual, a large collection of engines and machinery. Amongst these were a considerable number designed to meet the especial requirements of the building trades, and whilst according a passing tribute to the very high order of excellence maintained in the agricultural section, we will here confine our attention to those machines which should possess more than a passing interest with our readers.

The largest collection of wood-working machinery was that exhibited by Messrs. Western & Co., Chaddesden Works, Derby. Here was exhibited, probably, the first saw-bench ever driven by electricity; and as this was the commencement of what probably will be in years to come an important factor in the transmission of power for driving machinery, it deserves more than a passing notice. The power was generated by a Siemens dynamo-machine, driven by a belt from an 8-h.p. portable engine. In lieu of the ordinary fast and loose pulleys on the saw-bench, an electric motor was coupled directly on to the saw spindle and connected with the generator —which was some distance off— by wires running underground. The engine being put in motion, enough power was immediately generated to allow the saw, which was 30 in. diameter, to cut with ease ordinary 11-in. deals. The importance of the application of electricity to driving machinery will more readily strike us when we consider the endless uses it may be put to in a large city, such as sawing, printing, winding, pumping, grinding, &c., the power at the same time being generated at a distance, and being distributed to its users through an ordinary copper wire. In districts where water-power is available, and where fuel is dear, an electric motor will be especially valuable; and we do not see any reason why large power should not be generated at a central station in a town, and let out to users at so much per h.p., after the same fashion as gas is sold at per 1,000 ft.

Amongst the other exhibits at this stand was a well-designed centre-feed combined planing, jointing, tonguing, grooving, and moulding machine. The framing of this machine was cast in one piece, and the timber was fed by rollers which were all geared together, thus providing an uniform feed of great power, and preventing any tendency in the wood to slip. The machine was fitted with an adjustable top, a bottom, and two adjustable angling side-cutter blocks, which operate on all four sides of the wood at once. As the wood passes into the machine it is first dressed by the revolving under-cutter, which gives it a level and firm bed on the table, and thus lessens the jar or vibration caused by the operation of the top and side-cutters; the bottom of the board is furnished by a pair of fixed irons, fitted in a movable drawer, which take off a thin shaving. The angling side-cutters in this machine are especially well adapted for working elaborate under-cut mouldings, hand-rails, &c., which can be struck at one passage through the machine; this, and the general design and arrangement of the working parts combine to make it one of the most complete machines of its class.

Another exhibit of Messrs. Western was a combination machine, or "general joiner." This is constructed, with various additions, on the lines of an ordinary rising and falling spindle saw-bench. The saw-spindle is continued and fitted with a planing and moulding block. The wood to be planed is fed on an adjustable table beneath the block, by means of rollers. The table, feed-rollers, and cutter-block are all made adjustable, and can be raised or lowered independently of each other. To the framing of the machine is fitted a vertical spindle and cutter-block for working curved or straight mouldings, sticking sashes, &c. Tenoning, mitreing, and cross-cutting slides are also fitted, and the saw-spindle is arranged for boring. A countershaft, fitted with cone pulleys for changing speeds, is attached to the frame of the bench. This arrangement is compact, but we do not like it, as the centres are too short, and the friction on the belts and bearings is thus much increased; and in practice when sawing, say above 11 in. deep, we have found much heat conveyed from the bearings to the saw, causing it oftentimes to run out of truth; the belts and bearings, too, more rapidly deteriorate.

Amongst the other exhibits at this stand we noticed various band-sawing and shaping machines, and an extremely substantial self-acting feed circular saw-bench, arranged to carry saws up to 48 in. diameter. The bearings of this machine were let in from the top of the table. They can thus be readily examined, or the saw spindle removed, which is an improvement on some older pattern machines of this type.

Messrs. Charles Powis & Co., London, exhibited several engines and a number of wood-working machines. A "general joiner," which was shown in motion, possesses several features of interest. The main framing of the machine was cast in one piece, minimising the vibration as far as possible. The various operations of sawing, planing, or moulding can be carried on together or separately, the main spindle being divided in the centre. The wood is fed through the planing-machine by a powerful arrangement of grooved rollers. The planing end of the cutter-spindle is fitted with a slot mortising apparatus, arranged with horizontal and transverse movements. The lengths of the mortises are gauged by stop-pieces. Tenons are cut in this machine by means of cutters fixed to a pair of revolving discs, the wood being cramped vertically in a slide, and passed between them. The tenons and shoulders are completed at one operation. For grooving purposes, a "drunken" saw is employed.

We also noticed a handy combined circular and band-sawing machine, for steam or hand power. It was arranged also for tenoning by means of four saws, two saws mounted horizontally cutting the tenon, and two saws mounted on adjustable vertical spindles, cutting the shoulders. Other machines were shown here, but they did not possess any special feature of interest.

Mr. R. Taylor, of Bury St. Edmund's, exhibited several of his patented circular saw-guards, which he has designed to protect the sawyer from accidents arising from the wood being thrown off the saw. The guard consists briefly of a steel shield, formed as an arc of a circle. This is suspended from a curved bracket attached to the back of the bench. The shield is held concentric with the saw by a stud, and balanced by a counterpoise. It is made adjustable both vertically and transversely, and is held true over the saw by means of small guide rollers. As the wood to be sawn is pressed against the saw, the shield rises before it, and rests on the top of it till the cut is completed, when the counterpoise brings it back to its original position.

Messrs. Smedley Bros., of Belper, exhibited a well-designed, but roughly-constructed, combined mortar-mill, engine, boiler, and barrow-hoist. These were mounted on a wrought-iron girder-frame, arranged with travelling-wheels, lock, and shafts. The mortar-pan, which was driven from below, was geared directly on to the crank-shaft of the engine, the cylinder being fixed to one of the side standards of the mortar-mill. The driving-pinion was arranged to readily throw in and out of gear, so that the engine might be used for sawing or other purposes. A very useful adjunct, in the shape of a barrow-hoist, was fixed at one end of the girder-frame. This was worked by toothed gearing, and governed by a lever, which also acted as a brake in bringing down the empty barrow. For builders in a moderate way of business a well constructed and arranged plant of the above type should be especially useful. In a future number we may notice the remainder of the exhibits that should interest our readers.

TRANSMISSION OF POWER AT TWOPENCE HALFPENNY PER HORSE-POWER PER MILE FOR PRIME COST OF PLANT.

THE correspondence which has been recently printed in the *Times* between Sir W. Armstrong, Professor Tyndal, and one or two gentlemen of less known names, on the subject of the storage, and what the writers call the electric porterage of electricity, deserves the attention of all persons interested in industrial science. We have very recently (*ante*, p. 757) as well as on certain other occasions, called attention to the subject, but the issues involved are so vast, that our readers will desire to be kept fully up to the last news. It may also be of some service to hint that even men so distinguished in science as those we have named, will do more for the world, and more for their own permanent fame, the more they confine themselves to the duty of simple reporters of facts ascertained, and the less they assume the attitude of the controversialist, and allow themselves to bring forward statements which, however correct, are practically irrelevant to the matter in hand.

Such, for example, is the comparison made by Mr. Reynolds between coal and electricity. We must observe that a somewhat exaggerated view of the results described by Sir W. Thomson is obtained by the use of the unit of the foot-pound, which may be called almost microscopic, as applied to mechanics. The English thermal unit, commonly called "Joule's Equivalent" (from the name of the man of science who arrived at its determination), is 772 foot-pounds, or 0·344 of a foot-ton. This is the quantity of heat which will raise the temperature of a pound of water by a degree of Fahrenheit's thermometer. Theoretically speaking, the perfect and perfectly utilised combustion of half a grain of carbon would develop this quantity of heat, so that Mr. Reynolds is correct in stating that a million of foot-pounds of energy (exactly 1,013,240 foot-pounds) is stored up in an ounce and a half of pure carbon. But that is a mere scientific statement, very slightly connected with the value of the Faure battery. About the highest duty hitherto obtained from coal, and that under those peculiar circumstances which allow of the great economy of the Cornish engines in the simple and regular work of pumping water, is 109 million foot-pounds to 112 pounds of coal, or upwards of 16 ounces of carbon to the million foot-pounds, instead of 1½ ounces. Thus the comparison instituted by Mr. Reynolds starts from a fundamentally incorrect basis. As to the cost of transmission, it is, in the present case, that not of the transmission of the power, but of the apparatus including the power. That is a matter as to which much change may hereafter be effected. But it does not seem to us, as we before hinted, to come into the front line. For that electric forces will be sent about packed in batteries we regard as extremely improbable. The accumulative power, as we before hinted, is the first thing to master. Next comes the distributive power; and last of all the mode of transmitting the energy from the accumulator to the distributor.

Mr. Reynolds says, by wire ropes and by compressed air or steam, energy may be economically transmitted from ten to twenty miles. Exact data are here desirable. One of the most careful and really practical experiments ever made on the transmission of power by wire ropes was made (and we are glad to have the occasion of calling attention to the new scientific magazine, published at Boston, Mass., in the first number of which the very question of the transmission of power is dealt with by one of our contributors) by no less competent an engineer than Mr. Robert Stephenson, on the Blackwall Railway. "Over the length,"

* For further details of the interesting life and works of Winckelmann the references are numerous. Mr. Lodge's translation contains an excellent biography,—certainly the best that has appeared in English. There is also Heyne's famous "Eulogy"; see also Michaud's "Biographie Universelle"; Gurlitt's "Life" (in German); Hirsching's "German Biographical Dictionary," and Mdme. de Staël in a charming passage in her "Allemagne"; Rossetti's "Sepolchro di Winckelmann in Trieste," &c. It may not be uninteresting to add that, of the few portraits of Winckelmann, one, the work of Angelica Kauffmann, was, until very recently, if it is not at present, in the possession of M. Fuessly, of Zurich; but the most trustworthy portrait is that by Antoine Maron (brother-in-law of Winckelmann's great friend, the painter Raphael Mengs), now at the Weimar ducal palace, and which has, on more than one occasion, been engraved and lithographed.

says the article in question, "of 3¾ miles the friction of the ropes and winding machinery absorbed 251 h.-p. out of 324 h.-p. indicated, so that the force expended on the machinery was 3·4 times as much as that applied to the train." This cannot be called a very economical application of power. As to pneumatic transmission of power, there is a prohibitory limit in the conductivity of metal, and the loss or gain of heat, which is ever telling against the working power. Thus, while we must admit that the transmission of a containing vessel weighing 75 lb, for the transmission of 1,282 Joule's equivalents of heat, is in itself an economical paradox, it by no means follows that the fact that such a transmission has been accomplished, does not afford a new starting-point for the mechanic.

Sir William Thomson has not failed to call attention to the utility of that application of the electric accumulator, which we had previously indicated. He refers to a little battery of seven of the boxes described, as enough to maintain electric light to the extent of 100 candles per six hours. He also refers to the use of the gas-engine for the slow and steady accumulation of power, and, further, to that of a small portion of the steam-power of a sea-going vessel. There must be a vast number of instances in which the means of accumulating the energy of a very small, but constant, power, will produce what the mechanic requires for driving or lighting power, at little or no appreciable cost besides that of the maintenance of the apparatus.

We are, however, still of opinion that the point which, at the present moment, has the most interest for the scientific world, is the verification of the statement made by Sir W. Thomson in his letter of June 9, in which he refers, as we have more than once done, to his evidence before the Select Committee of the House of Commons on electric lighting. It is the prodigious assertion,—we can call it no less,—(if carried out it will be yet more prodigious) that "a copper wire of half an inch diameter would suffice to take 26,250 h.-p. for a distance of 300 English miles, losing so little by the way as to deliver 21,000 h.-p. at that distance. The prime cost of the copper Sir W. Thomson puts at 60,000*l.*, or less than 200*l.* per mile, for conveying this enormous energy. In fact, it comes to something under 3d. per h.-p. per mile,—and that not annual but primary cost. If anything at all approaching to this can be established, the problem of the cost of power must assume a totally different form from that which it at present occupies. The facts are so incredible (we do not say untrue, but we wait for tangible proof) that it seems there must be a mistake somewhere. But the figures stare us in the face. 60,000*l.* for transmitting 21,000 h.-p. for 300 miles. It works out 2·285d. per h.-p. per mile. We trust that we may have as good evidence offered in behalf of this view of conductivity as we now have as to the accumulative power of that form of secondary battery so lucidly described by Mr. Tyndall.

GAS-HEATED HOT-HOUSES AND GREENHOUSES.

WHEN after numerous trials, failure after failure has followed attempts to apply a principle which seemed to afford great promise, it is not to be wondered at that a popular verdict of "impossible" is recorded, further attempts are abandoned, and the idea is shelved. The heating of hot- and green-houses by gas affords a case in point. Everybody who knows anything about horticulture, cannot fail to be struck with the advantages that gas-heating would present over stove or hot-water heating, if certain defects in the application of gas to this purpose could be surmounted. Firstly, as regards stove-heating, the labour, and, more important, the responsibility and risk of stoking, especially of night stoking, would be avoided. A suitable arrangement of gas-burning having been devised and resolved upon, the entire labour of managing the calorific apparatus would resolve itself into turning on the gas at a proper height, shutting the green- or hot-house door at night, and letting things rest till morning. Secondly, a properly-devised system of gas-burning within the structure to be heated, involving, as it must, to be properly devised, a thorough and perfect ventilation, presents an enormous advantage over any other system which only secures the necessary amount of heat, ventilation being provided for by some extraneous means. It is not a matter of surprise that gas-heating has so generally failed, when we take into consideration the principles violated in this horticultural application. Universally, so far as the writer of this has seen, the mode of utilising gas for the purpose in question, has consisted in the adoption of some variety of gas-stove, yielding a smokeless flame, with no provision whatever for conveying away certain invisible and inevitable products of gas combustion. Not merely the public, but engineers, have yet to learn the potential agency of many invisible things. Beyond steam and air in motion (steam, let it be remembered, is invisible when dry), their notions of the potential agency of things invisible does not commonly go. Thus the gas engineer, when he has provided a smokeless gas-flame, and lighted it under a bath, guarantees his customer against all atmospheric foulness. If his conception of the potency of invisible things had been more profound,—if he had been brought to reflect on the restricted area of bath-rooms and the noxious emanations evolved from a gas-flame, however smokeless, he would have been more chary of his guarantee, not needing the evidence afforded by many recorded cases of asphyxia arising from this cause. About four years ago, the writer of this applied himself to solve the problem of heating a green-house by gas, and succeeded, as anybody else may succeed, by attending to what follows, and putting it into execution. He subsequently, with equal success, applied the same principle to a hot-house. The theoretical proposition was simple enough, viz., to get rid of all combustion products: the permanently gaseous ones by a ventilative current, the condensible ones by downcast tubes perforating the heating and ventilating main at suitable distances. Simple in theory, the solution of this problem was more hard in practice. Not until after many trials, and numerous failures, was success achieved. These shall be specified. The educational value of recorded failures pioneering success, is so much more valuable than a bare record of success, that it becomes a matter of regret they are not more frequently recorded.

The first resolve was to do away with any form of gas-stove. Why not burn the gas at one end of a horizontal main connected at its further end with an upright chimney? The gas-burner adopted was that commonly known as Liebig's, consisting of a drumhead of wire gauze stretched over a cylinder, left open at the bottom, so as to permit a free admixture of atmospheric air. The horizontal heat-distributing and ventilative main first tried, was made up of joined lengths of ordinary 4-in. wrought-iron stove-pipes. Though horizontal in its general aspect, downward bends or droops, almost imperceptible, were established, and at the lowest part of each a small leaden tube was fixed vertically, so as to give exit to all liquid condensed impurity. The contrivance failed ignominiously. Not only did the sulphurous acid product of gas combustion eat through the sheet iron with a rapidity altogether incompatible with every practical need, but for some reason not obvious at first, but plain enough on reflection, the system would not ventilate. On the first day of erection the draught was bad, and it became worse from day to day.

Abandoning the wrought-iron stove-pipe one of cast iron was substituted. It answered better than the first, but from some cause, not at once evident, the ventilation grew worse and worse. Being taken to pieces it was found choked with an accumulation of crystals, the mass containing a certain proportion of ammonia-sulphate and ammonia-sulphite, but still more sulphate of iron, it being well known that sulphurous acid, a first product of gas combustion, rapidly changes into sulphuric acid, and it was this which, by attacking the iron, had yielded the crystals of iron sulphate.

Yielding to this evidence, iron, both wrought and cast, had to be abandoned: equally would it have had to be abandoned for another reason, viz., the too easy heat conductibility of these materials. By accurate thermometric investigation it was discovered that all the heat for distribution had been evolved at a point very short of the upcast pipe or chimney; under which condition there was no draught, as theory indicates there could have been none. Here it may be well to direct attention to the fact that in all cases of heat distribution by tubular radiation provision must be made for conservation of sufficient heat to effect an ascending ventilative column in the upcast shaft or chimney, otherwise ventilation cannot go on.

Having abandoned iron, the third venture consisted in substituting earthenware. Common drain-pipe was tried and succeeded; but sufficient evidence has accumulated favourable to abandoning the use of any sort of tube, substituting in its place a rectangular trunk of brick or terra-cotta tiles. Many advantages suggest themselves from the adoption of this device. First, the distribution of heat would be more equal, being radiated from a larger area; secondly, the larger capacity of the rectangular tile-built chamber would nullify any back current which might be momentarily caused by a sudden gust of wind blowing down the chimney.

As already detailed, the result of substituting earthenware drain-pipe for iron was wholly successful; but some little points had to be studied, and the teaching of study applied before entire success was achieved. It was found, for instance, that full reliance could not be placed on a continuity of equable gas-pressure throughout the night, which difficulty was easily solved by using a gas-regulator. Again, many trials and much thermometric observation were brought to bear on the determination of best effective area of chimney gape at the out-of-door extremity of the chimney. This was accomplished by contracting the extremity of the chimney-tube with Roman cement moulded on from day to day, until a satisfactory result had been achieved. A round gape of 1½ in. was found best adapted to insure maximum ventilation with minimum loss of heat, in the case under consideration. Another detail consisted in finding a suitable material for the gas-flare to exhaust the severity of its first shock upon. An earthenware bend at first essayed for this application, was found inapplicable, on account of its repeatedly breaking. A cast-iron bell was ultimately adopted, and with success. The chemical objections to cast iron, when employed throughout the entire system, reduce themselves to a minimum of practical zero in the case described.

The fact should here be stated that the system of gas-heating now described remained under the writer's personal ken for two years, giving full satisfaction. He learns that it does so still, but the locality is many miles away, and for a long time has not been personally visited.

Finally, it will be here well to impress some pertinent facts on the memory of any one who, having perused this statement, may desire to adopt the expedient. To be successful, the underlying principles which dominate the process must not for a moment be lost sight of. It is no case for application of rough measurements or rough-and-ready workmanship. The shape as well as the dimensions of the green- or hot-house must be regarded: also its site, whether sheltered or exposed, whether there are or are not neighbouring erections, the effect of which would be to determine extraneous air-currents. The whole case must be treated as one of arrangement of a piece of chemical apparatus. But once settled, always settled. The practical working conditions of gas-heating for any particular structure having been once determined remain constant to the end.

It was not a little instructive on a sharp frosty day to watch the exit chimney and note the torrents of impure watery vapour continuously discharged. Anybody seeing them would never wonder again, if he had wondered before, at the destruction caused by gas-stoves in green-houses. Equally instructive it was to note the foul acid fluid liberated by the downcast exit-tubes, and to remember that all this would have been dispersed amongst the growing plants by an ordinary gas-engineer having no knowledge of invisible combustion results.

The Sanitary Institute of Great Britain.—The anniversary meeting of this Institute was held on the 14th inst., in the theatre of the Royal Institution, Albemarle-street, Lord Fortescue presiding. There were also present Earl Bathurst, Sir F. Pollock, the Hon. and Rev. Wyatt Edgell, Dr. Alfred Carpenter, Mr. E. Chadwick, C.B., and Dr. Richardson. The chairman presented the prizes of medals and certificates which had been awarded to exhibitors of the best sanitary appliances. Professor Chanmont, F.R.S., then delivered an address upon "Modern Sanitary Science." In a general summary he asserted that the prospects of sanitary progress were, on the whole, encouraging. The dinner of the Institute was held at St. James's Hall Restaurant.

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UNION CHAMBERS, NORTH JOHN STREET, LIVERPOOL.—Mr. David Walker, Architect.

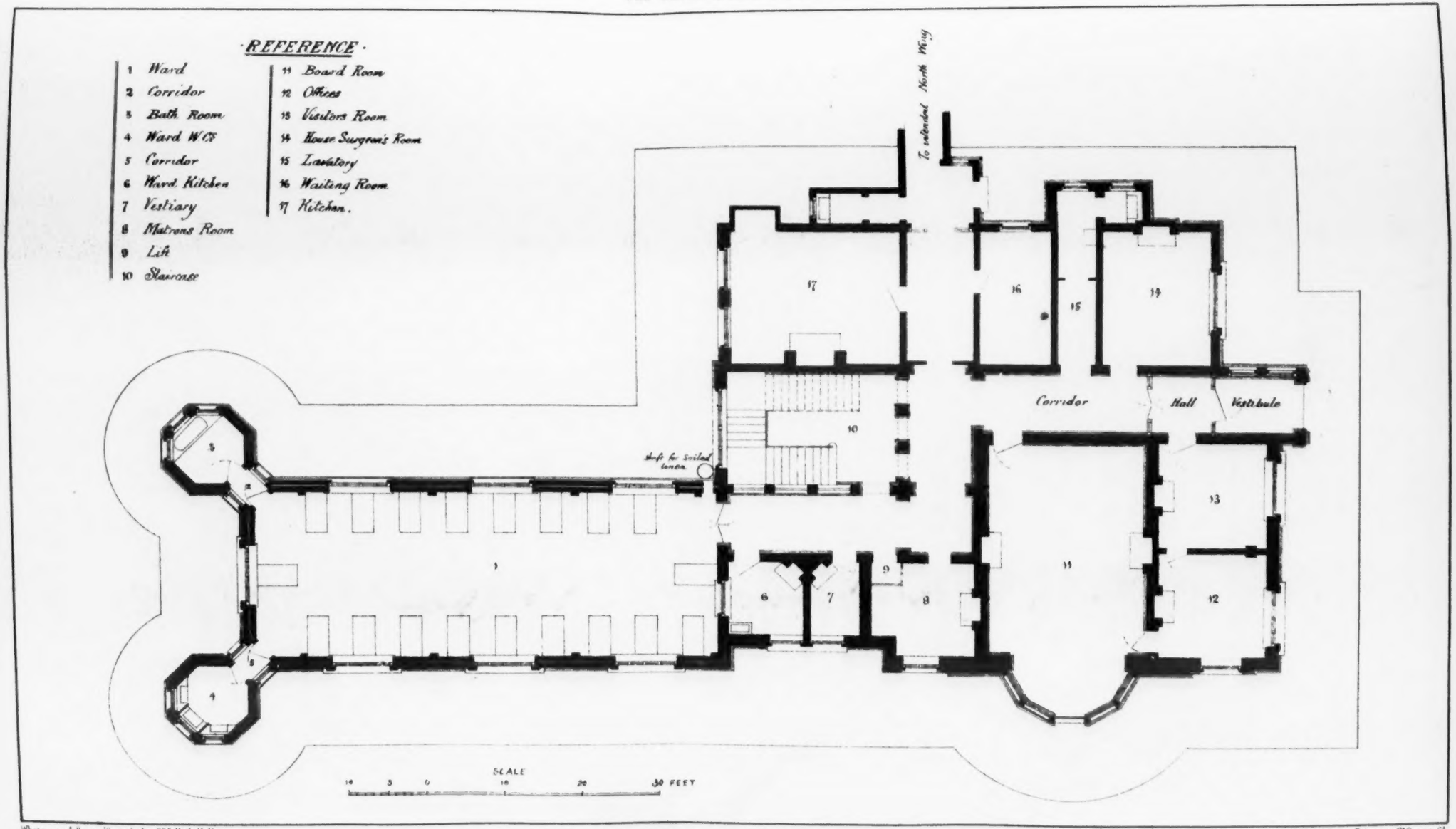
Whiteman & Bass, *Photo-Litho* 236, High Holborn.

HOSPITAL FOR SICK CHILDREN, BRIGHTON.—MESSRS. LAINSON & SON, ARCHITECTS.

Wyman & Sons, Printers, 74 Queen St.

THE LIEBFRAUENKIRCHE, OR CHURCH OF OUR LADY, AT TREVES: A.D. 1227 TO 1243.

ULM CATHEDRAL: THE CHOIR AND SIDE TOWERS.



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HOSPITAL FOR SICK CHILDREN, BRIGHTON.—*Plan of Ground Floor.*

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THE HOSPITAL FOR SICK CHILDREN, BRIGHTON.

On Thursday, the 21st inst., their Royal Highnesses the Prince and Princess of Wales opened the Hospital for Sick Children, which has been erected in Brighton. We give a view of the Hospital and plan of one floor. The building stands in about the centre of an acre and half of ground, which is the freehold property of the trustees of the hospital The site, in the Dyke-road, is surrounded with good property, and is much above the level of the sea. The subsoil is chalk; the materials used are red brick and terra-cotta. The present building consists of a south wing and a central block forming offices of administration; a north wing may afterwards be added. The building contains, on the ground floor, entrance porch, vestibule, corridor leading to staircase and inner hall office, matron's room, board-room, waiting-room, nurses' dining-room, kitchen and offices, staircase and one ward for twenty beds, house-surgeon's room. On the one-pair floor are, operating-room, ten bedrooms, one ward for twenty beds, one special ward for six beds. The two-pair floor includes one bedroom, one ward for twenty beds, and a convalescent ward for fourteen beds, making a total of eighty beds.

The lift is so placed that every floor can be served direct from the kitchen without the possibility of the smell of cooking reaching any part of the building outside the kitchen. The three principal wards are each 59 ft. by 22 ft., and 13 ft. in height, giving a cubical space to each bed of 843 ft. Each ward is warmed by a pedestal stove placed in the centre of the ward, having a fire-grating each way with downward flue, taking the smoke under the floor to a chimney-stack on the outside, common to all the wards. These fires are fed with fresh air from the outside by a flue running through the floor to underside of stove. Fresh air is brought into each ward by eight vertical flues, and the vitiated air is exhausted by means of Robt. Boyle & Son's air-pump ventilator. The w.c.'s and baths are placed in the octagonal towers, which are separated on each floor from the wards by a corridor with open windows on each side and double doors, the door leading immediately from the ward into the corridor must be closed before the w.c. door can be opened. These w.c.'s and bath-rooms are ventilated in the same manner as the wards, but separately. The ward floors are formed with Portland cement concrete and wrought-iron girders, which latter are entirely enveloped by the concrete; to avoid unnecessary weight the concrete is laid in a tubular form. To form principal floor, dovetailed fillets are let in flush with the concrete, upon which is laid a yellow deal floor, and upon this an oak floor grooved and tongued, and nailed angularly, so that no nail-holes are on the surface, thus avoiding any chance of germs or other matters finding a resting-place. The walls of two of the principal wards are lined with very large slabs of Mycene marble, highly polished. This preparation is exceedingly handsome, and almost, if not quite, non-absorptive; thus all danger of retention of germs, malarious gases, or organic matter, is avoided, as well as all painting or distempering and its periodical renewal. Want of funds prevents the adoption of this material to all the wards. To each ward is a ward kitchen and a vestiary. On the outside of the building is placed a galvanised iron tube 18 in. in diameter. This tube is carried above the eaves line and there fitted with a suction ventilator, and at the ground level is a door with open grating for the removal of the contents. This tube communicates with each ward by a small self-closing door, so that all soiled cloths, bandages, &c., may be at once removed from the wards without being carried through the building. Hot and cold water are supplied to all the water-closets, bath-rooms, and ward kitchens.

The staircase is spacious, and well lighted and ventilated, and is, with its landings, corridors, and passages, wholly of Portland stone.

The whole of the soil under the floor of the ground floor is covered by a bed of Portland cement concrete 6 in. thick, and the floor of the ground floor ward is formed thus:—First, a bed of Portland cement concrete 6 in. thick, then a layer of asphalte 1 in. thick, upon which is another bed of concrete 6 in. thick, and finally deal and oak floors in the thicknesses as described above.

The outside walls are built in two thicknesses, leaving a space of 1 in. in the centre, which is filled in with asphalte, and bound together by hoop iron, with the view of preventing internal dampness from external causes.

Internally, there will be no paint, distemper, or wall-papers.

The cost of the present erection will be between 10,000*l.* and 11,000*l.*

Messrs. Lainson & Son are the architects and Messrs. Cheesman & Co. the builders.

UNION CHAMBERS, NORTH JOHN STREET, LIVERPOOL.

This recently-erected pile of offices, the subject of our engraving, covers an area of about 130 square yards, and comprises five floors of offices, with a frontage to North John-street of 55 ft., and to Union-court of 24 ft. The depth of the land necessitated the bulk of the light being obtained from the main front, and this has been secured by the introduction of an arrangement of cast-iron oriels, carried upon massive corbels, above the basement-floor windows. Special arrangements have been made for ventilation, without dust or noise from open windows, and ample light is secured on each floor.

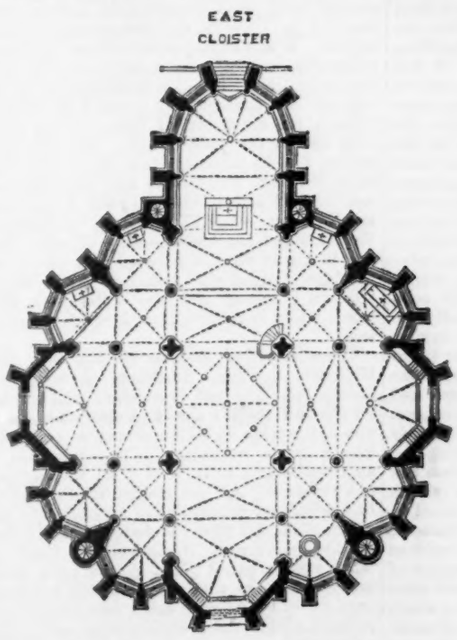
The materials used were Stourton stone for the ashlar, and Parbold grey stone for the rusticated base, the front to Union-court being faced with white bricks. Fireproof safes are constructed on each floor of offices, and a separate system of heating by hot water. The cost of the building was about 5,000*l.* The contractors were Messrs. Wells, of Bootle, near Liverpool, and the architect was Mr. David Walker, of Dale-street, Liverpool.

THE LIEBFRAUEN KIRCHE, OR CHURCH OF OUR LADY, AT TREVES.

The singularly beautiful Church of Our Lady at Treves is another of those architectural puzzles with which Germany abounds: fortunately the date of its erection is known, and, according to Kugler, it was built between the years 1227 and 1243. The plan of this remarkable building is very interesting. As will be seen, the whole composition grows out of the square of the area of the central tower or lantern; from this grow out a nave and transepts of precisely similar size and plan, each consisting of two bays and terminating in three-sided apses. The choir is similar to the nave as far as its first two bays are concerned, but beyond these it is carried two extra bays, and terminates in a magnificent five-sided apse. Instead of aisles, it will be noticed, there are four square compartments occupying the angle-spaces formed by the nave, transepts, and choir. Again, filling in the angles formed by each of these square compartments, and the second bay of each of the transepts and choir, or the second bay of each transept, together with the second bay of the nave, are triangular compartments, each of which forms the base upon which a semi-octagonal apse is described. Kugler* points out the great similarity between the arrangement of this church and that of the choir of St. Yved at Braine, near Soissons.

Now as St. Yved at Braine was consecrated in 1216, and the Liebfrauen Church at Treves commenced in 1227, it is possible that they are the work of the same architect, or that the church at Treves was copied from that at Braine. Upon examining the church at Treves, one is led to the conclusion that its design was the work of two different architects,—the one perhaps a Frenchman or a German working under French art influences, and the other a thorough German. The apse of the choir, the smaller apses and body of the church generally, look like the work of the Frenchman, and are well-developed Gothic, whereas the central tower or lantern and the west doorway, which are evidently no earlier than the rest of the building, and most probably are the latest things about it, are quite Romanesque in style, and Romanesque of a decided German character, they seem, in fact, to have no connexion with the other portions of the building. The windows of this church and the columns under the central tower bear a most remarkable resemblance to those of Westminster Abbey, and the absence of the square abacus, and the fact that the arches are acute and only very slightly "stilted," seem to suggest that the architect of the church may have been an Englishman, especially when taken in combination with the fact that the architect of the clearstory and east end of the Abbey Church of St. Willibrord at Echternach, about ten miles from Treves, was certainly an Englishman.† Notwithstanding this there seems, judging from the plan, to be the greatest probability that the Liebfrauen Church at Treves is a French design.

The cloisters which unite this church with the cathedral are most singular. The windows which light them have regular three-light geometric tracery, but all the arches are round-headed,—even those of the lights. It is quite evident that they are the work of some obstinate German who, while delighting in the beauty of French tracery, was determined not to give up the round arch. The experiment, which is also to be seen in a pilgrimage church near Echternach, has proved beyond a doubt that Gothic tracery is ill suited to the round arch, and that windows with circular heads do not admit subdivision so well as Pointed ones.



The internal fittings of the Liebfrauen Church are interesting. The altars, with the exception of the high altar, which is a Modern Gothic erection, are excellent examples of Early German Renaissance; and there is a noble monument of the same style to Archbishop Jacob von Syrk. These probably date from about the year 1525 or 1530; the monument may be a little earlier.

Upon the twelve columns supporting the tower and clear-stories of the church are paintings, life-size, of the twelve apostles, executed in the fifteenth century. From one point in the church, just as you enter it, all these can be seen together.

Architects' Benevolent Society. — A special general meeting of contributors to the Architects' Benevolent Society will be held on Tuesday, the 26th inst., at 5.30 p.m., to confirm the new edition of the by-laws, revised at the annual meeting held in March last.

* Handbuch der Kunstgeschichte von Franz Kugler. Stuttgard: Verlag von Ebner & Seubert. 1859.

† This interesting church has a clearstory and east end of pure Early English work, with mouldings and caps of the Salisbury type, triple lancet windows, and "dog-tooth" enrichments. The east end is filled up with a very large triple lancet window. The rest of the church is exceedingly early Romanesque work, except the towers, which probably date from the fifteenth or sixteenth century. This noble church had been used for many years as a china factory, but it has recently been purchased by the town of Echternach and reconverted to its original purpose. Unfortunately, the writer saw it late one evening, and there was no time to sketch it.

ULM CATHEDRAL.

IN June, 1877, the city of Ulm celebrated an event such as happens only rarely in a town of its rank. It was in the time of its growth and power that the Ulmers on the morning of June 30, 1377, laid the foundation-stone of their new parish church, which was to be the largest cathedral in Germany. A year before they had compelled the Emperor Charles IV. to a far from honourable retreat from before their walls, where he had appeared in order to force them to compliance with unjust demands; and but a few weeks prior to the solemnity connected with their church they had received the news of the victory of the United Free Cities at Reutlingen over the son of the Count of Würtemberg and the Swabian nobility. Even after, eleven years later, Count Eberhard the Greiner had asserted his supremacy in Swabia by his victory at Döffingen, Ulm continued to grow in importance. Its territory increased, trade and commerce flourished, and from that prosperous period dates the old German saying, "*Ulmer Geld regiert die Welt*" ("Ulm money governs the world"). And if, according to most recent researches, the statements, still believed in wide circles, respecting the number of population of many German towns in the Middle Ages have been proved in most cases as exaggerated, if, especially, the Ulm of that time hardly ever numbered more than 20,000 inhabitants within its walls, this fact speaks all the more in favour of the energy of that race which was able to entertain such far-reaching plans.

The erection of the cathedral was continued throughout the whole of the fifteenth century, more rapidly or more slowly according as means were abundant or otherwise; the builders being principally Ulrich, Matthäus, and Moriz Ensinger, a family of architects, as well as Hans Kuhn, Matthäus Böblinger, and, finally, Burkhard Engelberger. In the adornment of the interior rivalled with the heads of the at that time flourishing Ulm school of painters,—a Herlen, Zeitblom, Schühlein, Scheffner, — the glass-painter Hans Wild, and the wood-carvers Syrlin, the elder and younger, besides the architect Engelberger, just named. But soon after the beginning of the sixteenth century building operations stopped. The completion of the principal tower had been relinquished already in 1492, when large stones fell out of the tower vaulting. During Engelberger's direction, the tower was underpinned, and, probably, for the sake of greater safety, the two aisles were each divided into two by a series of slender columns. But in the time of the Reformation, and during the period of the Iconoclasts, far more serious and partly irreparable injuries were wrought in the interior. Thus the Dom, the most impressive monument of later Gothic, remained for centuries with the principal tower only half completed, and as well, or rather as badly, as possible, roofed over; without the choir towers, of which only the lower portion, as far as three-fourths the height of the nave, had been executed, and, together with the buttresses and piers, wanting both in security and adornment on the two long sides of the cathedral. Nobody thought of completing the latter during the seventeenth and eighteenth centuries, when bad times, worse government, and narrow views, as they began to prevail during that period in all similar communities, placed great obstacles in the way; the tendency of those troublous times showing itself also in gross neglect of the interior. Yet even in that dilapidated state their cathedral was still an object upon which Ulmers looked with pride, and a theme of admiration for the stranger, as we find in numerous testimonies of the age. Thus, Fritz Nicolai, a writer often unjustly decried, gives an exhaustive and intelligent description and criticism of the cathedral in his "Travels."

It was only in the fourth decade of the present century that the restoration of the Dom was taken seriously in hand, after, in 1817, the atrocity of whitewashing its interior had been finally committed, so that, as a contemporary account approvingly states, "people could no longer see on its walls the old paintings which often foster superstition"! Besides the sense and interest for the building as a work of art, which began to be generally awakened and was kept alive by art-lovers, the knowledge that the cathedral, if steps were not taken to prevent it, would become an utter ruin, helped much to preserve it. In the principal tower the cornice and the porch of the chief portal urgently required repair, and the erection of buttresses and pier-pyramids on both sides of the nave could no longer be postponed, on account of the threatening giving way of the walls of the centre aisle.

Thus, at first slowly, but, as means flowed in more abundantly,—especially after the success of the cathedral building lottery, — more rapidly and steadily, the works proceeded at first under the direction of the architect Mauch, next under the supervision of Thrän and his assistant Seebold, and after their decease under the guidance of the cathedral architect Scheu. An idea may be formed of the extent of the works required when we state that they included,—leaving out the repairs of the principal (west) tower,—the twenty piers and flying buttresses of the nave, the galleries over the two aisles, the eight piers of the choir, and the covered passage of the choir. The completion of the two choir or side towers has been in progress, under Scheu's direction, since 1875. We give in this week's issue a view of the towers on both sides of the choir at the south-eastern and north-eastern end of the nave. These towers will have a height of 281 ft. The southern one, completed in 1878, we believe, is shown in our illustration; that on the north side will be finished shortly. There remains the great task of completing the great western tower. This work, we are assured, together with the interior adornment of the cathedral, is being proceeded with as rapidly as safety will permit.

THE CHICHESTER AND MIDHURST RAILWAY.

IN 1861 Parliamentary powers were obtained for the construction of a continuation of the Mid-Sussex Railway from Midhurst to Chichester, to form there a junction with the main South-coast line of the Brighton Company's system. Midhurst had been before that time, and continued to be until Monday last week, indeed, a terminus of the Brighton Company. The proposed line was about twelve miles in length; the works were let and partially constructed, but were discontinued, and an Act obtained in 1868 for the abandonment of the scheme. It was subsequently revived, and the works were recommenced in 1878, and have now been completed. The line was inspected on the 24th ult., and subsequently certified by Colonel Yolland, for the Board of Trade; it has since been opened for public traffic. The week-day service, for the present, is four trains each way daily between Pulborough and Chichester,—time 1 hr. 10 min.; three between Pulborough and Midhurst,—time 27 min.; and two between Midhurst and Chichester,—time 41 min. The new line, with the Mid-Sussex, forms part of the Brighton Company's system. The South-Western Company has also a station at Midhurst, which it reaches from Petersfield on the west.

There are five stations on the new line. Midhurst, Cocking, Singleton, Lavant, and Chichester. The last is enlarged and adapted for the new traffic; the other stations are new. The old station at Midhurst will be converted into a goods warehouse. The new one is approached by a 40 ft. road from the highway to Chichester. All the station buildings on the line, which are convenient in arrangement and commodious, are from the designs of Mr. Myres, of Abingdon-street, Westminster. They are what may be called Old English in style, in red and white bricks, with stone mullions and dressings. The top story is cased with timber, and covered with panels in cement with carved floral ornaments.

The Midhurst and Singleton stations are nearly alike, and in common with the others are provided with roomy houses for the station-masters, with living-room, kitchen, scullery, pantry, and three good bedrooms. The architect has thoughtfully utilised recesses by fitting them with drawers, cupboards, &c. The whole of the internal woodwork at the stations is of pitch-pine, varnished. The accommodation for business includes a booking-office, 16 ft. square; ticket clerk's office, 15 ft. by 14 ft. 6 in.; general waiting-room, 16 ft. by 15 ft. 6 in.; ladies' waiting-room, 15 ft. 6 in. by 12 ft. 6 in.; refreshment-room, very handsomely fitted up, 18 ft. by 15 ft.; with ample accommodation in lavatories, closets, &c. The ladies' ante-room has a marble table with water-supply for two tip-up basins. The mantelpieces are of slate and marble polished. Lead-fret glazing, with cathedral tinted glass, is freely introduced. The roofs are covered with flat red tiles, and have terra-cotta ridges and finials, with the chimneys effectively grouped. The principal elevation (Midhurst station) is very good,—an open porch for the entrance being a feature. There is a roomy and light subway connecting the platforms. All the stations have covered platforms, very graceful structures, supported on elegant cast-iron columns and brackets. The South-Western Company reaches Midhurst from Petersfield to the west. The Brighton Company has made provision for the South-Western to run in on the north side of their up-platform, which is 600 ft. long. The platform roofs have zinc on their outer, and glass on their inner, slopes. The platforms are laid with Coombe rock metalling, which becomes an excellent smooth hard surface.

The line crosses the South Downs that extend from Lewes and the valley of the Ouse in the east to Salisbury and the Avon in the west. This necessarily involved some rather heavy works, including three tunnels. The first is Cocking Hill, and is 738 yards long; the summit of the hill is 92 ft. above the tunnel. The second tunnel is under Drove Park, the finely-wooded and beautiful seat of Lord Leconfield. This tunnel is 740 yards long, the ground over it varying from 2 ft. to 60 ft. The thin crust was tunnelled rather than passed in cutting, that the beautiful scenery might not be marred, or the difficulties and dangers of fox-hunting increased. This is one of the favourite covers and hunting-fields of West Sussex. The third tunnel is under West Dean Park, the property of Mr. F. Bower; it is 441 yards long, and in the centre at nearly equal distance between Midhurst and Chichester. This tunnel has, at the highest, 112 ft. of earth, &c., over it. In addition to these works there is a tunnel-bridge 49 yards long, at a point near Mid-Lavant, where the line passes under the Chichester high road. The tunnels are egg-shaped, and of five-ring brickwork. They are handsomely faced at the entrances with red and white brickwork, a 4 ft. pilaster on each side crowned with an entablature, a panelled parapet, and caps and copes of Portland stone. The most important of the station works are those that have been executed at Singleton. This will be the nearest station for Goodwood race-course, about two miles distant. The large accommodation that will be required during the race-week, and the natural formation of the ground, necessitated heavy works. To economise the space, and provide the necessary accommodation, a concrete retaining wall was built 400 yards long, 25 ft. high, with a batter of 1½ in. to the foot. It is above 6 ft. thick at the base, and 3 ft. at the top. The station buildings and accommodation here are similar to those at Midhurst; but in addition there is 500 ft. of dock-accommodation for carriages. The platforms aggregate 400 yards in length, and are 25 ft. wide. There are three-fourths of a mile of sidings, or accommodation for fourteen trains of twenty carriages each. There is a goods-shed at the end of the station, 60 ft. long by 30 ft. wide, with five hydraulics, a 46 ft. turntable for engines, a line of rails through the goods-shed, goods office, &c. There is a pumping-house at the other end of the station. The approach is by a 60 ft. road from the Chichester highway, with a separate road to the goods-station. There is ample platform and waiting-room accommodation for each sex upon both platforms. A large lavatory for gentlemen has been provided in an extra building. There is a refreshment-room upon each platform.

The gradients on the line are comparatively easy, the stiffest being 1 in 60 for a short distance; there are occasional breaks of lengths on the level. The summit, about half a mile beyond Cocking tunnel from Midhurst, is 287 ft. above Chichester, and 203 ft. above Midhurst.

There are ten over, and twenty-four under, bridges on the line. Eight of these are wrought-iron girders; five with cast-iron girders; eighteen are brick-arch bridges; two for the crossing of the highway, and one ornamental bridge for Mr. Bower's accommodation. The under-bridges are built for a single line, and are 14 ft. between the parapets, except one near Cocking, and three near Singleton, that are built for a double line, and are 25 ft. between the parapets, which are 4 ft. 6 in. high, with red or blue brick coping. All the over-bridges are built for a double line, and one north of Singleton Station for three lines of rails. All the brick bridges are single arch, with wing-walls, newels, pilasters, and stone caps.

The chalk slopes in cutting are one-half to 1, in gravel, &c., the slopes are 1½ to 1. The bases of cuttings at formation-level were 19 ft. for single and 30 ft. for double line. The sleepers for the permanent way, 9 ft. long, 10 in. by 5 in. scantling, are laid right to the 21 ft. rail. The rails are 84 lb. to the yard, and are of steel at all curves.

There is a fair proportion of the line on embankments, from which charming views are obtained. Between Midhurst and Cocking, for instance, there is an embankment two miles long. Cocking station is high, and close to the South Downs, and very extensive views of hill and dale, wood and water, can be commanded from that and other points; some of them taking in the Isle of Wight, Hayling Island, and other places on the coast. Near Cocking the Crypt ravine is crossed by a short embankment 56 ft. high. Between Drove-tunnel and Singleton station glimpses are obtained of the grand stand and the hill at Goodwood. The station platforms at Singleton are on an embankment 20 ft. high, from which also good views are commanded, amongst others over a part of West Dean Park, the seat of F. Bower, esq. The grounds are extensive, and laid out with great taste. West Dean House, a large mansion, is an interesting curiosity in building. The front is built entirely of flints dressed with sharp arrises. The ornamental bridge, built by the company, to connect Mr. Bower's severed property, is opposite his gates, and is built of red brick, with white brick facings, Portland stone caps, and ornamental panels of flint-work in the pilasters and parapets. At Mid-Lavant the line passes close to the churchyard where the celebrated author, divine, and controversialist, Dean Hook, of Chichester, formerly Vicar of Leeds, was buried. About a mile from Lavant, Chichester Cathedral and spire are sighted, and at the end of another mile Fishbourne signal-box is reached, and the line curves round and runs alongside of the South-Coast line for about three-fourths of a mile, to form a junction with it at Chichester station. A new goods station has been built here 145 ft. long and 35 ft. wide.

At Cocking, where the line intersects Lord Egmont's property, special works were constructed, to enable his lordship to quarry chalk from both sides of the line, and to convey it to the station.

A good deal of useful material was obtained from the line. Abundance of excellent sharp sand was taken out. From a cutting at Lavant the whole of the top-ballast for the line was taken, as also for the concrete wall at Singleton. For this the gravel was not only well-screened, but thoroughly washed in the stream. It was made up with blue *lias* lime. The bricks for the tunnels and bridges were made by the contractor from clay got from the line, and from a field belonging to the railway company. They were all made by machinery in the contractor's own brickfields.

The principal landowners on the line are the Earl of Egmont, Lord Leconfield, Mr. F. Bower, the Hon. and Rev. A. Legge, the Bishop of Chichester, and the Hon. Vernon Harcourt; these eminent personages may be expected to put a good deal of traffic on the line in valuable timber, and other woodland and agricultural produce. Great quantities of copse wood and willows are produced in the district for conversion into baskets, cask-hoops, wattles, &c. A great deal of charcoal is also made in the district.

The line was laid out by Mr. F. D. Banister, engineer-in-chief of the Brighton Company. Mr. Horace J. Mannering has seen the works carried out as resident engineer, with Mr. J. Phillimore as clerk of the works. Mr. T. Oliver, of Horsham, has been the contractor; the arrangement of the points, signals, and signal-boxes has been intrusted to Messrs. Saxby & Farmer the well-known signal engineers.

Art Loan Exhibition at Windsor.—On Monday last H.R.H. the Princess Beatrice opened an Art Loan Exhibition at the Albert Institute, Windsor. The exhibition includes works by Rubens, Michelangelo, Titian, Canaletti, Gainsborough, E. M. Ward, Gustave Doré, Greuze, E. W. Cooke, R.A., D. Maclise, R.A., Van Beest, Sir Joshua Reynolds, Romney, H. Vernet, Constable, Sidney Cooper, Cattermole, and others. Her Majesty contributes a series of water-colours by Paul Sandby, chiefly of views of Windsor Castle and precincts, date 1750 to 1780, and several works by the same artist are contributed by other residents in the town.

KESWICK.

EXCEPTING only one word, Bunyan's description is applicable, for it is in a "most pleasant, mountainous country, beautified with woods, vineyards, fruits of all sorts, flowers also, with springs and fountains, very delectable to behold." It is out of the course of great trades, and hence there are not the impulses to progress other places know, but it is in the path of the pleasure-seeker, and it has known a little of that steady growth which has set in, since by the growth of communication and the distribution of wealth, Lakeland became the holiday haunt of Britain. Compare Keswick of the past with that of the present, the town before its railway era with that we know, and it will be seen that it has gone "down the ringing grooves of change." A little more than twoscore years ago, when the Derwentwater estates had just been sold by the Greenwich Hospital Commissioners, Keswick was composed of one long and stony street; it had a manufactory of coarse woollen cloths and a smaller one for the fabrication of finer textures. Upon the Greta there was a forge, and tools, spades, and similar articles were made,—lead was worked and pencils made, and there distinctive industry ended. The population of the place was 2,159; the Derwentwater had pleasant seats and residences on its bank. There were seven or eight pencil-makers; two inns only were named, but there were eighteen taverns and beersellers. A coach did duty for passenger traffic, two mail gigs conveyed letters and parcels, and three carriers were then unabolished. In the list of residents, occurs that of "Robert Southey, esq., LL.D. (poet laureate), Greata Hall," lighting up the undistinguished ruck of "nobility, gentry, and clergy." In a few years, Southey has passed into his rest with most of his contemporaries, and something has been done by the extension of the railway system towards making a city of what was his solitude, and the Keswick of the present is widely different from that of the past.

One of the boasts of Keswick now is its local organ, and that guardian of the interests and chronicler of the doings of the town can tabulate for the capital of Lakeland half a dozen churches, chapels, and meeting-rooms; can record at length the doings of its local bodies and the result or accompaniment of their labours in a very diminutive death-rate, as well as place upon its page the changes in the trade of the town; but probably in nothing is the change better exemplified than in the fact that the town is now brought within a limited distance, so far as it is measured by facility and quickness, of communication from most of the great centres of population in the kingdom. In that extension of railway facilities, not only has the town of Keswick been benefited, and the district of which it forms a part, but the benefit has been reciprocal, and one of the great pleasure spots of the kingdom has been brought within the reach of the many, instead of the few. The result has been to swell the demand in Keswick for that accommodation which has become necessary, and to give to the town the element of growth it had not previously known. It is not that in population it has known the progression of a Chicago, but in the intervening years there has been a steady accretion of population, and the town has struck out its little shoots and additional streets, and is still sending them out, and names them after its great poet, after its hills, and after other of the things it prides itself on. And, coupled with this, it has added to the neat mansions that are on the shores of Derwentwater; and it has increased its hotel accommodation by the addition of stately structures that compare well with the older inns of the past. Its industries have not increased: pencils are still one of the special manufactures, and lead is mined, at and near it; but agriculture around it, and the preparation for, and the reception of visitors, as well as their comfort and their conveyance, support the little town of beauty. It runs its seven coaches daily to Windermere; its hotels are very many in proportion to its population, but they are pleasant places of rest and refreshment,—solid as well as liquid,—instead of the bars and gas, glitter and gin, that dominate in some of our great cities. In Keswick the advantages of association are known; for roads and for recreation, for the cheap waterworks of the Local Board, for literary associations and scientific societies the townsmen unite in an endeavour to make their town and district more enjoyable to themselves, and more attractive to visitors. Thus in that beautiful spot of England, which Cumberland and Westmoreland enshrine, Keswick is the acknowledged capital; and of the days of a man's life, few are more pleasant than in that "land of streams," which poets have sung of, which painters have depicted, and which presents, long after the visit, its hills and dales, its streams and lakes, to the memory. Keswick has grown comparatively great: the growth of its hotels, its lodging-houses, its coach accommodation, the fleet of boats that press the dark bosom of Derwentwater, and the villas that stretch along the side of the lakeward roads, all point to that growth. In the past, hotels such as that of Lodore would have been impracticable, for the guests could not have been conveyed, but now rapid and cheap communication seems likely to make a city in the solitude of some of the lakes. And with the careful sanitation which Keswick shows, with its abundant supply of purest water, with a Local Board that fulfils the duties attached to it well, there should be in the future a continuation of that growth which the past has known. The benefit of these retreats from the world which is "too much with us," and that from the occurrence of that holiday, which may be called, in Dickens's words, a "happy, unsubstantial idle time," cannot be overrated, and it is well for us that "the unconquered arm" of steam has enabled the beauties of the Lake district to be placed before all classes. Our health resorts need especial care, that they may be fit for their use; that they shall be cities of health; and that all the conditions that are essential to health restoration and to the enjoyment of the oases in time shall be presented by them. It is because it has appreciated this, and because it endeavours to carry it into practice that the pleasant little town of Keswick has grown of late from the smaller secluded Paradise Southey knew. And if it may have lost one or two of the charms which to some natures seclusion gives, it has far more than counterbalanced these, and that especially in the benefit that it gives to the swollen streams of visitors who make it head-quarters for tours from lonely Wastdale to fair Bassenthwaite.

WIND PRESSURE AND WIND MOVEMENT.

THE subject of wind pressure has been recently discussed by the American Society of Civil Engineers. It may be in the remembrance of our readers that in some of our own remarks on this important subject, especially with reference to the great estuary bridges of Scotland, we spoke of the large allowance for this element of stress that was made by American engineers. The Institution, however, is not satisfied with the actual state of scientific information on the subject, and has recommended further experiments. One or two very remarkable facts were brought out in the discussion, with reference to which, however, it may be questioned whether in an island of the size of Great Britain it is reasonably probable that a tornado could attain the fury with which blasts of that nature have been known to sweep over large districts in America, and also in India.

One of the remarks of the American engineers is to the effect that the speed of the wind is at times much greater at 100 ft. or 200 ft. above the ground than it is on the ground itself. We think it is undeniable that this may, at all events at times, be the truth. We have estimated the movement of clouds at thirty-five miles an hour, when the movement of wind shown by an anemometer was very considerably less. It is in accordance with the properties of a fluid like the air that it should *drag* over the ground, running over itself, and flowing at a much greater speed at a distance from the cause of frictional resistance. It follows that an allowance of from 30 to 50 per square foot, which is common in America for bridges, ought to be considerably increased for a lofty viaduct. Near the eastern end of the Great Bridge at St. Louis it is stated that a tornado actually lifted a locomotive from the rails, without damage to the way, and deposited it in a ditch by the side of the line.

The Marshfield tornado was a well-known storm in the United States, the track of which was followed by Mr. Shaler Smith for forty-six miles. The track was about 1,800 ft. in width, and the tornado developed a lifting force of 58 lb. per square foot. A small house, with 13-in. brick walls, was levelled to

the ground by this tornado, and a piano standing in it was lifted by the wind and conveyed for a distance of 270 ft. In the Saint Charles tornado a lifting power of 85 lb. per square foot was developed, but the track was not more than 60 ft. wide. It passed through the centre span of the St. Charles Bridge, and took up a barrel of tar which stood there, which it burst to pieces. In the route of this tornado the walls of the houses that were overthrown usually fell outwards, showing that a vacuum followed the burst of the storm, and that the expansion of the air within the house was the cause of destruction.

It must be remembered that the normal atmospheric pressure is not far short of a ton per square foot (at 15 lb. to the square inch it is 2,160 lb. to the square foot). Thus the reaction, or rush of the atmosphere to fill a vacuum caused by a tornado, is likely to have a far more rapid action, and thus to be more destructive, than the direct force of the storm itself. Some remarkable instances of this have been mentioned by us in our recent papers on lighthouses, and we cited a case where cast-iron doors, at a considerable height above the sea, were burst open outwards by the vacuum caused by the fall of a heavy wave around the tower. Whirlwinds and waterspouts at sea develop phenomena of a similar nature to tornadoes by land, and may be more conveniently studied. The writer of these lines on one occasion counted as many as fifteen water-spouts in one day over the Bay of Naples. From the top of Hermon, in northern Syria, the sandy waste to the east of Jordan may be seen to be traversed by whirling columns of sand,—the water-spouts of the desert. The whole subject is one of deep interest, for the physicist as well as for the engineer, and is one which we shall rejoice to find treated with an exhaustive care befitting its importance.

AN OLD-FASHIONED SUMMER.

SUMMER is upon us, with its old-fashioned intensity. Without any attempt to discuss the thorny question of the displacement of Saints' days, and other calendar dates, first by the slow changes of sidereal movement, and then by the acts of Popes and of Parliaments in the reformation of the calendar, we may venture to record the occurrence of a St. Swithin's day without rain,—if not without cloud. And the difficulty as to the adjustment of the calendar does not interfere with the fact that the weather which prevails when the sun has advanced some two-thirds through the sign Cancer, is generally steady and durable, for a month or more, whether it be wet or dry.

With a dry July we are enjoying a hot one. As a rule, July is the hottest month of the year. But then, also as a rule, it is one of the wettest. Mr. Symons, who may be said to have succeeded St. Swithin of Mediæval times, and Aquarius, of the Classic era, as president of the weather, tells us that "July, August, and October appear to be the wettest months at most stations, but that in mountainous districts December, January, and February are far wetter than any others. In fact, the seasons appear almost reversed." In 1880, 5·11 in., or rather more than a sixth of the whole rainfall of the year, fell in July, during which month rain fell on twenty-three days. The mean temperature of the dry-bulb thermometer was 61·7° Fahr. The maximum heat was 75·5°, the minimum 48° Fahr. This temperature of last year was almost exactly the mean temperature of July for the past twenty years, which is given by Mr. Plant, of Moseley, near Birmingham, as 61·6° Fahr. In eleven out of the last twenty summers, July was the hottest month. At the close of the present July we shall probably find the average of 61·6° to have been considerably exceeded. Nor is the heat local alone. It seems to be general in its distribution. In the United States sunstroke has made numerous victims. At Florence the thermometer has reached 99° Fahr. in the shade. On the 15th of July the temperature stood in the Strand at 95° Fahr. in the shade at one p.m, and later in the afternoon at 98° in the shade, and 123° in the sun. At five p.m. the shade temperature was 90° Fahr.

Glorious as the weather is for the corn-crops, it is not unattended by much personal suffering, especially for the residents in the metropolis and other large centres of population. Nor is it a question of comfort or discomfort alone. The death-rate becomes unusually high. The journals teem with complaints as to London smells. The intolerable character of the tepid water which is drawn from so many neglected cisterns leads to new essays to improve the water-supply of the metropolis. We are not undervaluing the need of reform in this respect; but we cannot too loudly call attention to the domestic cisterns. We would recommend every householder to see that the cistern or cisterns from which he draws any fœtid water are thoroughly and effectually cleaned out, so that at least we may not make use of water more impure than that which flows from the mains of the companies.

It is refreshing, in such weather, to hear what Liverpool is doing to provide for the wants of her 550,000 inhabitants as to water. Within the last ten years she has added 60,000 souls to her population; and Rivington Pike no longer suffices for her mains. At a distance of sixty miles from the head spring of Severn, the river Vyrnwy, after a course of thirty-five miles, falls in on the left bank. It is a mountain stream, formed by the union of a multitude of branches, and drains about 350 square miles of mountainous and little-peopled country. The waters of this stream and its affluents will be impounded at Llanwddyn by a vast dam of 1,255 ft. in length and 140 ft. in extreme height, raised across the valley. A lake of some five miles long, with an area of over 1,100 acres, will thus be formed, and a triple row of pipes of 60 inches diameter will be laid to convey the water to Liverpool, at the distance of seventy miles. The supply is calculated at 52,000,000 gallons a day.

As to London, pending the re-introduction of any measures into Parliament for the regulation of the water supply, attention is now being invited to the application of Dr. Clark's process for softening the water already supplied. The water of the several metropolitan companies (in the year 1877) varied from 12·9° to 13·8° of hardness on Clark's scale, with the exception of the Kent water, which has a hardness of 19·1°. This hardness, however, is reduced by boiling to from 3·1° to 3·6° in the case of seven companies, and to 5·6° in the case of the Kent company. A committee has now been appointed to collect and spread information on the subject of the application of Clark's process to the softening of the metropolitan water, and the Chelsea company, which made experiments on the subject in 1851, are to be applied to, to renew their experiments. The degrees of hardness are equivalent to the number of grains of bi-carbonate or sulphate of lime contained in a gallon (or 70,000 grains) of water. At or below 6° of hardness, water is regarded as soft. Above that, it is called hard. There is no doubt that the process may have the result of removing all the chalk in excess of 1½ grains per gallon from the water treated. The practical difficulties of the operation, however, are considerable.] The pipes conveying the water treated become choked with a mass of minute crystals of carbonate of lime. And it was reported in 1851, by a chemical commission appointed to consider the value of the process of lime purification, that even when combined with filtration it was insufficient to remove the yellow tinge of Thames water during flood, nor did it appear to abate an objectionable taste of vegetable matter which the water also possessed at such times (see "Water and Water-Supply," p. 47). As the water of all the other companies, not even excepting the Kent, becomes soft by boiling, and as for culinary and washing purposes water is usually boiled, it hardly seems to us that it is by way of introducing the lime process that the most practical reforms are to be made in the London water-supply. If the committee were to turn their attention to a house-to-house inspection of cisterns, we think that much more utility might follow their labours.

Meantime the demand for water steadily increases. The population of London (vol. xl., p. 719) is now 3,814,571. This requires, according to the present rate of allowance, an annual daily supply of 122 million gallons, and a daily supply during such a month as the present of more than 140 millions of gallons. In July, 1859, the daily flow of the river, for the average of the month, was not more than 422 millions of gallons, so that London wants already to drink a third of the summer flow of the river. What does an abstraction of this magnitude mean, unless it be accompanied by those precautions as to purity of which we talk so much and accomplish so little? Let any tourist look at the water of the river Wey, as it passes under Guildford Bridge. Let him reflect that it is on its way to its junction with the Thames, above the intakes of the Metropolitan Water Companies. What reflections he will then make we do not now offer to guess. But a thermometer at from 80° to 90° indicates a state of the atmosphere in which impure water becomes something more than disagreeable, and tends to the conclusion that a death-rate of 20·1 is, after all, much lower than might easily have been caused.

"A DAY IN THE COUNTRY."

"Help me to give the poor children of my parish a day in the country."—*Ecclesiastical Circular.*

THE benevolent clergyman who discovered the meaning of what his agricultural parishioner intended by "nailing a mossifer," and has made known to the world that to "nail a mossifer" means to inhale the atmosphere, could, if he would allow his benevolence to extend its influence a little farther, tell us many a story of the happy healthful results of "a day in the country."

At this season of the year every post carries urgent appeals to the charitable on behalf of the children of our terribly overcrowded neighbourhoods, calling upon us all to help in affording the poor little ones the means of enjoying the pure air, which, it has been said, is alone to be met at a distance not less than ten miles from London. It is true that the metropolis is every year becoming a very much greener place than it has been in the memory of old Londoners, and really at some portions it seems again to be returning to the appearance that antiquaries tell us Cheapside and the City presented in the seventeenth century, when the fig-tree and the vine were conspicuous in the heart of London. The last space lately opened on the Thames Embankment, beneath the shadow of the Victoria Tower, and fitly named Victoria Gardens, promises to be a great boon to crowded Westminster. But even these open spaces, much advantage as they afford to the little ones, and which are, indeed, sufficient to remove those absurdly exaggerated statements that horrify one occasionally by the information that thousands of young people are brought up in London who have never seen a green tree or a blade of grass, are yet very insufficient to afford the delight, the health, or the influence on the imagination of a lovely luxurious meadow, with its splendour of buttercups, or, later on in the year, its rosy-toned clover, or the mystery of the tree-shaded woods, the variety and the beauty that are associated with a hedge-row.

A little of this enjoyment and advantage may be obtained even by a day in the country, a day passed within ten miles of London, but it is a question whether very great good to the health of a child is gained by merely one overcrowded day of enjoyment passed in the country; let there by all means be as many days as we can spare at this or any season of the year, and let us do our best to aid that more liberal, more sensible project which we are happy to see has already taken a very definite form, of allowing our overcrowded districts to send their little ones for at least a week into the country. Then we should see the gain to happiness and morality secured by that indirect influence on the health, which acts through the mind from the recollection of happy hours and agreeable memories, memories of the novelty of first impressions during hours and days of monotonous routine.

A day in the country is scarcely sufficiently distant from the heart of London to secure the pure air which we all sigh for; a day with its heat and excitement compressed into a few hours does not suffice for the good that we all of us desire that the mass should experience, but a week, a whole week in the country, what health, what memories, what good may not result from such an experience. How many are there of us who cannot look back to our own recollections of a week in the country, the memory of which will never fail us as long as we live? How often have we, whose lives are passed in London, not rejoiced to see our little ones return happier, more beautiful than when they left a week before, more fitted, because happier and stronger, for the wear and tear of daily life. But this happy result we must confess has generally been in the return from the seaside, where the invigorating influence of the air, of bathing, is even greater than that of the surrounding greenery afforded by an inland stay in the country.

Mr. Mark Fisher has been elected a member of the Institute of Painters in Water-colours.

THE CAMBERWELL NEW FIRE BRIGADE BUILDINGS.

THE Camberwell Fire Brigade Station in Peckham-road has just been rebuilt, by direction of the Metropolitan Board of Works. The station, until recently, was limited to the ground-floor for the engines and offices, with two or three apartments above. The building has now been carried up to a height of about 50 ft., and consists of three lofty floors, containing large and convenient apartments for the officers and men belonging to the brigade. The building, which has a handsome elevation to Peckham-road, is faced with white Suffolk brick, and stone and red brick dressings, and is relieved by ornamental bands in terra-cotta. The elevation is surmounted by a lofty gable, with bold stone coping. At the rear of the building there is a tower and look-out, rising to a height of 80 ft., and commanding an extensive view around the metropolis, from which a fire raging in any district may be easily seen.

The building has been erected from the designs of the Metropolitan Board's Architect, Mr. Taylor, of Brixton-road, was the contractor.

GREAT COST OF THE LONDON AND NORTH-WESTERN COMPANY'S GOODS STATIONS.

MR. GEORGE FINLAY, general manager of the London and North-Western Railway, who was one of the principal witnesses examined last week, before the select committee of the House of Commons now sitting on railway rates and fares, incidentally stated some important statistical facts as to the cost of the goods stations belonging to the company in London and several of the large towns. He said that in providing goods station accommodation the North-Western Company had spent 2,300,000*l.* in London; 812,000*l.* in Manchester; 280,000*l.* in Birmingham; and 1,913,000*l.* in Liverpool; and that these sums were altogether exclusive of the immense amounts which the company had expended in passenger stations in those towns. The sum actually expended in providing goods stations in Liverpool was twice as much as was required originally to construct the Manchester and Liverpool Railway. He added that in addition to the expenditure which the company had incurred in the construction of these large stations, they had also to provide an enormous mass of sidings for the reception of train loads. At Willesden they had provided twenty miles of sidings, and at Edge Hill, Liverpool, thirty miles; and they had in course of construction at the latter place another eight miles.

THE NEW FORTH BRIDGE PROJECT.

IT has at length been decided that the construction of the great bridge across the Forth shall be proceeded with, notwithstanding that a Bill authorising the abandonment of this stupendous undertaking, has already passed the House of Commons. At a special meeting of the shareholders of the Forth Bridge Company held last week, the chairman, Sir James Falshaw, presiding, it was resolved to withdraw the Bill from the House of Lords, and to proceed with the erection of the bridge. At this meeting the chairman of the company observed that the Bill for the abandonment of the scheme had been opposed by the three southern railway companies —the Great Northern, the North-Eastern, and the Midland—who were not satisfied that the bridge could not be built, thinking that the construction of the bridge was practicable. He added that they had submitted it to the engineers of their respective lines, namely, for the Midland, Mr. Barlow; for the Great Northern, Mr. John Fowler; and for the North-Eastern, Mr. T. E. Harrison. These gentlemen had examined the ground, and looked at all the circumstances, and the result generally was that the bridge, as designed by Mr. John Fowler, was the one that had been looked upon with the greatest favour by the companies. He then further stated that the directors had come to the conclusion that it was best for themselves and the shareholders to withdraw the abandonment Bill, and that to meet the expense of constructing the bridge, which was estimated at 1,370,000*l.*, the four railway companies—the Great Northern, the North-Eastern, the Midland, and the North British—had agreed to guarantee two millions sterling, and the shareholders who had already entered on the scheme were to be guaranteed 4 per cent. The guarantee is apportioned as follows:—North British, 30 per cent of the whole; Great Northern and North-Eastern jointly, 32½ per cent.; and the Midland, 37½ per cent. It was unanimously resolved to withdraw the abandonment Bill, and the construction of the bridge is to be proceeded with according to Mr. Fowler's design, which, the chairman said, had been approved by Mr. Barlow and by Mr. Harrison, who had both expressed their opinions to him that it was a thoroughly substantial bridge, not a suspension bridge at all, but what was called a continuous girder bridge. The chairman added that he knew Mr. Fowler to be about the ablest man they had in the kingdom, and if any man could build a bridge like that, which should be permanent, which should endure as long as the railways lasted, Mr. Fowler was the man to do it.

FROM FOREIGN AND AMERICAN SERIALS.

ITALY.

Giornale dei Lavori Pubblici (Rome, July 13). The late serious accidents to workmen, especially in Rome, have directed public attention in Italy to their protection from the carelessness or niggardliness of their employers; and an article in this number gives a sketch of the measure introduced by the Government for this purpose, and which is expected to pass the Italian Parliament. Its provisions are very stringent. The responsibility of all accidents in buildings, mines, quarries, or workshops, is laid upon the contractor or proprietor; and it is for him to exonerate himself by proving that the misfortune was due solely to the negligence of the person injured, or to unavoidable causes. If he proves contributory negligence, the fact is to be considered in fixing the indemnity; but otherwise, the workmen injured are to be compensated as follows:—For temporary disablement, full wages until recovery; for total and permanent disablement, three years' full wages; in case of death, one year's full wages to childless widow; half wages until the children are grown up, to widow with children; two-thirds to widow with children, where there are also dependent parents; three years' full wages to childless widow and dependent parents. These sums may be transferred to benefit societies, and recovered by them. When an indemnity is decreed, it is to be paid at once, even when an appeal is pending. Workmen cannot contract themselves out of the provisions of this Act. Although this law (if passed) will be severe on contractors and employers generally, it is considered that their past negligence has justified strong measures; and the *Giornale* points out that they can protect themselves by means of accident insurance, which is a new thing in Italy, having only been introduced within a few months by a single company.

AMERICA.

The Scientific American (July 2).—This number contains details of the Storer Garbage-cremating Furnace for the consumption of town refuse. It consists of a brick-lined cylinder about 60 ft. long and 6 ft. in diameter, having an incline of about ½ in. to the foot, which is caused to rotate by a wheel and screw. At the feed end of the cylinder is a fireplace, in which the pulverised fuel used in the operation is ignited. At the further end is a combustion-chamber, in which the gases are decomposed, previous to their escaping by the smoke-stack. The garbage, passing through this cylinder, is exposed to the flame generated in the fireplace; and is either dried for use as manure, or burnt to ashes, according to the length of the time which it occupies in passing through the cylinder. This is regulated by the speed at which the cylinder revolves. It is calculated that a furnace of this size will consume 350 loads of garbage in one day.

The Scientific American (New York, July 9.—An interesting note on the history, composition, and preparation of water-glass is to be found in this paper.——A flagstone, 25 ft. by 15 ft., has been cut at Waterville, N.Y., for which $5,000 has been offered, delivered in New York. As, however, it is too large to be carried by railway or canal, the question of the means how to remove it, seems to be a problem not easy of solution.——The roofing-slate industry in America, which ten years ago was not of sufficient importance to be mentioned in the census returns, now employs 3,000 men and $3,000,000 capital. Last year 600,000 squares (of 100 ft.) were produced, of which more than half were raised in Pennsylvania. The blue-black slates, from Maine, are the most durable, and are said to rival best Welsh. Green, purple, red, and variegated slates are also found; but the colour does not last.

COMPETITION CARDS.

THE competitive designs for Christmas and New Year cards now on view at the Egyptian Hall, sent in by 879 competitors, and some 3,000 in number, include some very excellent work,—better, indeed, than any we have before seen applied in this direction. The judges, Messrs. G. D. Leslie, R.A., Briton Riviere, R.A., and W. Hagelberg, of Berlin, have made their award, we are told, but it will not be published until Monday next. Twenty of the sets are to receive 1,000*l.* between them, and fifty other sets are to be selected at 10*l.* per set. Judging from advertisements from dealers in Christmas cards, and the money paid by some of the firms who do not advertise, the trade in them must be enormous.

SALE OF THE LATE SIR CHARLES REED'S MANSION AND GROUNDS, TOTTENHAM.

A NUMEROUS company was attracted to the Auction Mart, on Tuesday, by the announcement of the sale by Messrs. Debenham, Tewson, Farmer, & Bridgewater, of "Earlsmead," Tottenham, the freehold residence of the late Sir Charles Reed, chairman of the London School Board. The property was described as being situate at Page-green, Tottenham, and immediately adjacent to the Seven Sisters and South Tottenham Railway Stations. The mansion itself was stated to be a richly-decorated residence, and there are adjoining cottages and grounds, the whole occupying an area of about four acres. It was added that the property had four frontages, which materially increased its value as a building estate. The biddings commenced with an offer of 4,000*l.*, upon which an advance of 500*l.* was immediately made, and by further advances the property was quickly brought up to 6,500*l.*, when the biddings slackened, on which the auctioneer announced that the property was now altogether in the hands of the company, and would be sold at the price offered if there was no advance, although he considered that 9,000*l.* or 10,000*l.* was a low estimate of its value. By further advances the property was brought up to 7,450*l.*, at which sum it was sold to a syndicate, with the intention of its being laid out as a building estate.

SEWERS AND SEWERAGE.

Burgess Hill (*Sussex*).—The Local Board of Burgess Hill have appointed Messrs. Bailey-Denton & Co., their engineers, to carry out a scheme of sewerage and sewage disposal for their district.

Watford (*Herts*).—The urban authority of the above town have called in Messrs. Bailey-Denton & Co. to modify the present arrangements on their sewage farm by the introduction of intermittent filtration in combination with wide irrigation.

Portland Cement.—Messrs. Matheson & Grant, in their Trade Report, say:—"The factories in the London district, from their local advantages, still govern this trade, and prices have tended to increase slightly with the summer demand. The cost of carriage bears so high a proportion to the price of English cement in foreign countries that attempts to manufacture it abroad are constantly being made. In Russia, whither large quantities are shipped, local factories are being encouraged by a considerable addition to the duty on imported cement. This is likely to limit the export from London to the Baltic and Black Sea, and may tend also to deteriorate the quality of engineering structures in Russia, the evil results from the use of untried cement not being easily detected for some time. The present price for export ranges from 7s. 6d. to 8s. 3d. per 400 lb. cask."

THE LATE DEAN OF WESTMINSTER.

QUIETLY, painlessly, almost suddenly, full of labour, if not of years, regretted by troops of friends, one of the foremost men of the England of the nineteenth century has sunk under the great summer heat of July, 1881. Ripe scholar, graceful writer, effective if not altogether ready speaker, courtly gentleman, kind-hearted man, Arthur, Penrhyn Stanley, Dean of Westminster, has filled a large space among the notabilities of the day. His memoirs and memorials fill a large space in the journalistic literature of the past week. It is not as such that we have to speak of him, and that not because we could not find much to say, but because space cannot be afforded in our columns for an adequate treatment of any one of the varied phases of an active and honoured life. Still less does it become us to enter into any of those fierce contentions which are not yet extinct as to many of the acts and views of Dean Stanley. There are those among us, as good and as able as he was, who regard many of the chief problems of human life from an altogether opposite stand-point from that taken by him; and whose chief regrets will be that the views which they contest should have been supported by a man adorned by so many noble qualities, or rather, that the golden thread which they hold to run through the whole web of their convictions should not have bound into more perfect symmetry the admitted virtues of the man they so often opposed. With all that we have here nothing to do; nor have we space to speak of a topic more germane to our pages,—the thorough human charity of the man; his love and care for the dwellers in squalor and misery around the Gothic walls of his deanery; his large sympathy with whatever is human. If his remains have not "a tomb of orphans' tears wept on them," yet the memory of himself and of Lady Augusta will long live in something more divine than marble or than brass.

But a word is due from us to the memory, not of the man, but of the Dean. Dr. Stanley's name will be identified with the Abbey not less notably than that of any preceding dean or abbot of Westminster. Haunters from childhood of the sacred precincts, there are those among us who claim an hereditary interest in the Church of St. Peter at Westminster, partly *atavis editi regibus*, as humble members of the "founder's kin," partly as representatives of the artistic hands that have lent some of its chief adornments to the pile. To such, and to all who love and venerate this corner-stone of English history, the memory of Dean Stanley will be dear. What has been done under his presidency for the re-establishment of a solemn and reverent service in the choir is not special to Westminster. St. Paul's owes at least an equal debt of gratitude to its present Dean. Hardly a hamlet so remote but that it feels the influence of the wave of greater earnestness, and therefore deeper reverence, that is flowing over almost every form of religious worship in England.

Our chief concern, however, is with the debt due to the late Dean as the conservator, the historian, and the very voice, of the holiest of our holy places. Under his impulse Westminster first became, since the expulsion of the monks, a place of public worship in the broadest sense of the word,—a place whither the reverent student of sacred antiquity might turn aside from the whirl of City life, and hold commune with the memories of the mighty dead, unvexed by the demand of "twopence for the verger." The care of the monuments, the apposition of printed cards giving the most needed information, the evidence in every corner of the building of the desire that the Minister should tell its own story to every attentive inquirer, will, we hope, not be allowed to sink to rest in the grave of Dean Stanley. And as to the actual material structure, how much of its present order is due to him? Well do we remember being present on the occasion,—and giving some account of it in our columns,—when Dr. Stanley appealed, not in vain, for public support for the restoration of the Chapter-house. The changed state of the whole of that portion of the precincts: Chapter-house, cloisters, chapels formerly hidden; stones on which the inroads of the mouldering teeth of Time have been arrested by the art of the chemist; bit-by-bit repairs of portal and of tracery, on the very lines of the artists of the time of Henry III.,—all these were the work of Dean Stanley. To state what he did for the Abbey and the precincts would be to write a full, and not one of the least important, chapters in the history of the fane in which our monarchs are crowned. It is a chapter which we should gladly see written. In it, if worthily accomplished, will be inscribed, in an architectural sense, the best epitaph of Dean Arthur Stanley.

PATENT RECORD.*

APPLICATIONS FOR LETTERS PATENT.

2,881. A. H. Elliott, New York, U.S.A. Crushing stone, &c., and making blocks for paving, building, &c., therefrom. July 2, 1881.

2,883. H. P. Dunnill, Ironbridge. Decorating tiles, &c. July 2, 1881.

2,898. F. Grinnell, Providence, U.S.A. Extinguishing fires in buildings. July 2, 1881.

2,904. W. Moore, Lyminge. Composition for polishing articles of furniture, &c. July 4, 1881.

2,920. W. W. Hewitt, Swanscombe. Apparatus for conveying cement, &c., from place to place. July 4, 1881.

2,921. H. J. Haddan, Strand. Roads and pavements. (Com. by J. Salvat, Morceux, France.) July 4, 1881.

2,935. J. Louis, Minories. Supporting, &c., persons outside buildings. July 5, 1881.

2,945. F. D. Harding, Hampstead. Applying decorations to doors, &c. July 5, 1881.

2,969. E. Aldous, Peckham. Ventilating purposes. July 7, 1881.

2,975. E. Johnson, St. Helens. Manufacture of bricks, tiles, &c. July 7, 1881.

2,978. H. J. Haddan, Strand. Chimney caps. (Com. by A. Pichereau, Cailly, France. July 7, 1881.)

NOTICES TO PROCEED

have been given by the following applicants, on the dates named.

July 5, 1881.

861. W. Morgan-Brown, Southampton-buildings. Hanging doors and blinds. (Com. by E. Prescott, Hampton Falls, U.S.A.) March 1, 1881.

906. G. L. Shorland, Manchester. Stoves and fire-places. March 3, 1881.

1,044. R. Douglass and J. Douglass, Coventry. Apparatus for the cure of smoky chimneys, &c. March 11, 1881.

1,101. M. E. Dearnaly, Mirfield. Bricks, and the method of binding them together in building. March 14, 1881.

1,210. J. Bernard, Great Winchester-street. Baths, &c. March 19, 1881.

July 8, 1881.

934. F. Hyatt, Kensington. Core or skeleton metals, and applying the same to the construction of buildings, &c. March 4, 1881.

1,143. W. R. Comings, Upper Thames-street. Door locks. March 16, 1881.

1,290. W. R. Comings, Upper Thames-street. Bells, knockers, &c. March, 23, 1881.

ABRIDGMENTS OF SPECIFICATIONS

Published during the Week ending July 9, 1881.

4,861. C. G. Pfander, Queen Victoria-street. Apparatus for filtering water.

A cylindrical case is formed within which are a number of radial partitions. The compartments thus formed are charged with the filtering material, and the water enters the bottom of the first compartment and rises through it till it flows over the partition into the second, through which it descends, then ascends the third, and descends again through the fourth, and so on, when it is drawn off. Nov. 23, 1880. Price 6d.

4,972. A. C. Engert, Bromley-by-Bow. Fire-grates.

A chamber is formed at the back of the grate, open in front, but closed on all the other sides, in which the fuel is heated before it is drawn forward to be burnt in the grate. The smoke, therefore, from burning the fuel is greatly decreased. Nov. 29, 1880. Price 6d.

4,986. W. Morris, F. P. Preston, J. E. Prestige, and E. J. Preston, Deptford. Apparatus for regulating and controlling the flow of water, &c.

The cistern is fitted with a syphon for flushing purposes, and the long leg of the syphon is connected to a cylinder, fitted with a piston operated by a handle. The inlet from the syphon is at one end, and the outlet to the closet at the other end of the cylinder. By moving the piston, a vacuum is created which immediately fills the syphon and causes a flush. Several different arrangements are shown. Nov. 30, 1880. Price 8d.

* Compiled by Hart & Co., Patent Agents, 28, New Bridge-street, E.C.

4,992. J. Harsant, Vauxhall Bridge-road. Sink trap.

A bell-shaped chamber has a curtain dipping into the water contained therein, and a ventilating pipe is fitted communicating with the space enclosed by the curtain and with the open air. (*Pro. pro.*) Nov. 30, 1880. Price 2d

4,996. J. Walker, Lower Clapton. Cocks and taps.

Glands are formed at the top and bottom of the cock, and the plug is constructed with three tapers, one in the water-way as usual, another from the water-way towards the top for the gland, and the third from the waterway towards the bottom for the lower gland. Dec. 1, 1880. Price 6d.

5,057. J. F. Hoyne, Water-lane. Apparatus for regulating and controlling the passage of atmospheric air through outlets and inlets.

A tube is filled with coke, asbestos, pumice-stone, &c., through the interstices of which air can freely pass, while at the same time a strong current is broken up. This tube is made to fit the aperture in which it is to be placed. Dec. 4, 1880. Price 2d.

5,102. N. Talard, Paris. Pipe-joints.

Lateral lugs are fixed on one end of the pipes, to which are pivoted links, the free ends of which have eccentrics that can be turned by levers. On the other end of the pipes are jaws corresponding to the lugs. The ends of the pipes being placed together with the lugs opposite the jaws, and the eccentrics being turned, the two ends are brought tightly together. Dec. 7, 1880. Price 6d.

CHARITABLE AND PAROCHIAL ESTABLISHMENTS.

SIR,—I am sorry to find, by the notice you have done me the honour to give your readers of my work on "Charitable and Parochial Establishments," that I do not appear to have clearly stated what it was in my plans of the St. Marylebone Infirm Wards that received the commendation of Dr. Bridges, the Local Government Board Inspector, and consequently you do him the injustice of supposing that he "has something to learn on the subject of planning and arranging such buildings." Permit me, therefore, to say that no one (not excepting yourself) has more persistently decried than he has, the principle, as a principle, of placing the beds of a ward down the side walls instead of, as usual, against the outer walls. In the case, however, of the St. Marylebone Infirm Wards, to which Dr. Bridges' commendation was confined, the problem to be solved was the erection of a three-storied building, to contain 250 infirm inmates, upon a site 104 ft. by 64 ft., with frontages on two sides only, and if it could have been shown that it was possible under such conditions to have planned these wards so that all the beds should be placed down the outside walls, as is generally the case with all modern hospital wards, then undoubtedly he would have condemned the result of my labours instead of extolling it.

The building in question was erected for the reception of infirm and aged paupers,—a class of persons occupying their wards almost continuously day and night, and the majority of them, though suffering from no acute disease, and able to get up and be dressed during some part at least of the daytime, yet too weakly to often move a great distance from their beds, and consequently it was desirable that each ward should be so planned, as to form a combined sitting and bedroom. The usual mode of planning such wards on a site so contracted as that at St. Marylebone would have been to place the beds in four rows, two being next the outer walls, and two separated by a low partition in the centres of the wards. By this plan it would not have been possible to place the beds at a sufficient distance apart to allow the windows, excepting upon rare occasions, to be open while the inmates were lying in bed; but by the plan adopted by me, the patients can all be lying in bed without any inconvenience arising from the current of air passing through the wards when the opposite windows are open, and thus the maximum amount of cross ventilation is secured. Dr. Bridges, as I understand it, agrees in this view, and so, also, will you, Sir, I venture to hope.

H. SAXON SNELL.

"Evans's."—We are asked to mention that the purchase of Evans's, Covent-garden, by the Falstaff Club is now complete. The premises have been transferred, and the alterations for the purposes of the club are in progress. An old and familiar resort which, in its day, was a very popular place of amusement, has ceased to exist. In the upper part of the house, moreover, the Institute of Architects held its first meetings.

AT A LECTURE BY MR. HELLYER.

AT the repetition given of one of the recent lectures on plumbing, the chair was taken by Colonel Thorneycroft, who thus introduced the lecturer:—It may appear strange to you that a chairman should have been brought you so far as I have been, from the Midland counties, but I presume it is because I have given so much attention to this subject and have spent so much money upon it, and it delights me greatly that in London you are becoming aware of the danger of ill-ventilated and badly-drained houses. I made many experiments and spent much money in my own house, and if the National Health Society will accept my remarks and the plans I made of those experiments, I shall be glad to give them, for their republishing, for the benefit of their society. This lecture is on sewage and ventilation, and the Society of Arts have kindly given the use of this splendid room; but what a pity it is that so clever and learned an association should have such a dreadfully ill-ventilated room. It is unfit to lecture in, filled with splendid pictures, but no fresh air; in fact, the air is foul and offensive, because there is no ventilation equal to the wants. There are a few things that it requires: a gas-engine to force in fresh air, and another to suck out the foul air; the gas apparatus at the top does not half do it this hot night. This room reminds me of the besom-maker who turned his donkey out on the common where there was no pasture; and his friends remonstrating with him, he replied, "Well, if there is nothing to eat there is a delightful prospect;" and I say of this room, "If there is no fresh air there are splendid pictures." We want fresh air here for the benefit of listeners. What is the use of splendid pictures if you are panting for fresh air? It is kind of the Society to lend the room, and we are grateful, but they should for their own benefit get it better ventilated, and then more would listen with pleasure and not injure their health. I am delighted that our friends in London are alive to the interest of the subject of this lecture on drainage and ventilation. I have, with the assistance of others at Wolverhampton, started a Sanitary Protection Association, but we get on very slowly. It has been started eight months, and we have got about eighteen customers. These are fully satisfied; but what a struggle to get so few; remember there are 70,000 inhabitants in the town. How long shall we be in getting the town healthy at this rate? Well, I have got some friends to join me in trying to impress on the Government the desirability of having compulsory inspection to all houses, on the same plan as is now adopted with education: all are compelled to comply. Well, health should go with good education, but it wont go without compulsion, so I hope London will join with the country in pressing this point. It can be done at such a trifling cost. You are fortunate in getting such a gentleman as Mr. Hellyer to lecture on this subject, because I believe he understands this subject as well as any man in London, and the more you all know of the subject the safer for you all. Let me, in conclusion, press on you all to have your houses inspected by the sanitary engineer, and after that try them yourself, as the proof of the pudding is in the eating. Open the drain-pipe just a few yards from the house, then let sulphur be burnt in the pipes, and blow the smoke up the pipes with bellows, and if any one smells the sulphur in any part of the house the owner may be sure that he is living in sewer gas, which is deadly and dangerous. I could talk to you for a long time on the subject, it is so important, but I must now content myself by introducing to you the lecturer.

THE NEW ART GALLERY FOR BIRMINGHAM.

THE Mayor of Birmingham (Mr. Richard Chamberlain), on Tuesday last laid the inscription-stone of the new buildings in Congreve-street and Edmund-street, which are to form the Corporation Art Gallery and the offices of the Gas Department. Since the commencement of the alteration in the structure of the Free Libraries and Midland Institute buildings, the town has been without any public art-gallery, the collection of pictures and objects of art formerly contained in the gallery in Ratcliff-place having been temporarily exhibited at Aston Hall, while additions purchased by the Public Picture Gallery Fund trustees have had to be comparatively hidden from general view in the committee rooms at the council house. It will be remembered that last year Messrs. George & Richard Tangye made an offer of 5,000*l.* for the purchase of additional objects of art if the Corporation would at once take measures to provide an art gallery commensurate to the wants of the town, and 5,000*l.* more if a similar sum were raised by public subscription. It was felt that so generous an offer ought not to be disregarded, and while there was every ground to believe that the public would readily second Messrs. Tangye's benefaction by a large subscription, there was a difficulty to overcome in providing from the corporate funds a suitable building, the means of the Free Libraries Committee, limited to a rate of a penny in the pound, being almost wholly required for the libraries alone. A solution, however, was fortunately suggested, which it is hoped will prove satisfactory. The Gas Department, which had hitherto carried on their business at the premises of the Staffordshire Gaslight Company in the Old-square, were in need of better accommodation, and an arrangement was come to whereby the Corporation placed at their disposal the unoccupied land adjoining the Council House upon the condition that the Gas Committee in erecting their offices should reserve the upper story for a Museum and Art Gallery, the expense of this upper story being taken into account in fixing the ground-rent (if any) to be paid by the committee. This arrangement met with approval, and steps were taken to carry it into effect. The Gas Committee were instructed to have plans prepared, and to at once proceed with the construction of the foundations. As the new buildings are to form a continuation of the Council House, the preparation of designs was referred to the architect of that structure, Mr. Yeoville Thomason. The buildings are to cover the site bounded by Congreve-street, Edmund-street, and Eden-place. Upon the ground floor and lower ground floor will be commodious offices for the use of the Gas Department, which will communicate on the ground-floor with the Council House at each end of the structure. The whole of the first floor will be appropriated to the Art Galleries, for which a main entrance will be provided from Edmund-street. There will be six galleries, communicating with each other by archway entrances, the largest gallery measuring 80 ft. by 43 ft. The area of wall space, calculated, to a height of 16 ft. above the floor will amount to 12,208 superficial feet, exclusive of one large gallery, 98 ft. by 53 ft., which is to be set apart for an industrial museum. The external elevation of the building will form generally a continuation of the Council House, the front to Congreve-street being varied by a portico in two stories the full height of the building, and emphasising the entrance to the Art Galleries. The elevation at its junction with Edmund-street will be terminated by a clock-tower. The elevation to Edmund-street will be in harmony with the other elevations of the Council House, but in much plainer style, the principal portion having a receding centre, with projections at each end, finished with curved pediments. The entrances to the gas offices in Edmund-street will be sufficiently marked to produce variety in the design. The elevation to Eden-place will be similar to the present, except that the upper windows are omitted, and moulded panels worked instead. The site was prepared and everything got ready for the stone-laying by Messrs. Barker & Sons, of Handsworth. The clerk of works, Mr. Trevena, and the foreman, Mr. J. Morton. The contract for the erection of the superstructure has not yet been entered into.

UTILISATION OF SAWDUST.

SIR,—Seeing in the *Builder* lately that a suggestion had been carried out for the utilisation of sawdust, I beg to suggest that it should be used to a much greater extent than it is, for the deadening of sound, in the erection of houses, particularly those which are likely to be let off in apartments, and blocks of buildings which are fitted up as dwellings for artisans and others. Considering that about two millions of people in London are living in apartments or dwellings, it is strange that their comfort has not been studied to a greater degree than it has, in prevention of sound by filling up the spaces between the floor-joists with sawdust. It would be well if owners of property knew more of the fearful annoyance which neighbours are to each other, and unavoidably so too, to a great extent, simply through the sounds being heard so distinctly by those underneath them. The children are half-imprisoned, the mothers are harassed beyond measure, and neighbours are at variance, through the noises of each other being heard so distinctly.

C. H. B.

Books.

German, Flemish, and Dutch Painting. By H. J. WILMOT BURTON, M.A., and E. J. POYNTER, R.A. Sampson Low & Co.: London, 1881.

THIS is one of the series of illustrated text-books on art which are being published under the editorship of Mr. Poynter. The title-page, we observe, assigns him joint authorship in the book, but what is his precise share in it there is nothing to show. The name of the other author, who, we suppose, is the actual writer of the greater part of the book, is new to us.

The book appears to us to be one of the best we have seen of the series. It is more satisfactory than the volume on Classic and Italian painting, partly, perhaps, because the subject is more manageable and more easily grasped in a single small volume. The "German School," which is the section of the subject treated first, is traced from its origin, that is to say, there is an opening chapter devoted to "the origin of the German School," but it serves to indicate that the information available upon that part of the history of German art is very restricted. The short chapter on "the precursors of Albert Dürer," however, contains some interesting matter in relation to painters whose very names are hardly known except to professed art students; and the writer does not forget to consider the art in relation to the changes in the times, and to note the spirit of advance, of looking forward rather than back, which the Reformation brought into art as into every other department of human study. Albert Dürer and his followers, including the "little masters" (the Behams and others), are well and rather fully treated of; Holbein and his successors follow, and then the history of the decadence and revival of German art follows. It may be a question whether the latter deserved the name of a revival or not, since it consisted in persistently looking back to the art of a past day and trying to reproduce it. The movement was the counterpart, in fact, of the pre-Raffaellite movement in England, but it did not show the strength and sinew which the painters of that school in England certainly did show, in spite of their perversities of precept and practice. The German pre-Raffaellite movement was more closely connected with a religious movement, ecclesiastical in its tendency, than was the case with us. Art was to be a sort of worship, and worship was to go hand-in-hand with art. When Mendelssohn was in Rome, the younger generation of this school of revivalists were active both in painting and in religious rites, and he describes their devotion to the musical service of the church, which he admired; "one capital fellow of a painter standing next to another, and all shouting like demons," the last phrase referring to their delivery of the Gregorian chants. But all that does not make painting. The German revivalists, says the author, endeavoured to adapt to the mystic style of Fra Angelico, the types of Raffaelle, in which Grecian beauty is visible; and to avoid the fault of which they accused the Dutch School, of not knowing how to idealise the real, they fell into the opposite extreme of being unable to realise the ideal. Certainly no school represented by men who could paint at all could have been more insipid and academically dull than this German revival school, which, indeed, seems hardly worthy of a place in a book dealing with the names and schools which make the essential greatness of German and Dutch art. While noticing the subject, one may be allowed to question whether it is entirely true or just to say that the Dutch painters could not idealise the real. Artistically speaking, there certainly seems to be something like idealisation in the splendid way in which the arrangement of light and composition is often made to give such force and meaning to groups of figures in themselves, no doubt, prosaically realistic.

The history of the Flemish School shows the same kind of influence, and consequent weakening of the art, at a far earlier period, when the Flemish painters began, as has been said, to *Italianise*, and aim at emulating and imitating a school of painting and a class of pictures quite alien from the natural genius of the Flemish mind. The author points out how the portrait painters, such as Antonio More, drawing direct from nature, maintained the superior and robust qualities of Flemish art even when the treatment of ideal subjects had become little more

than an imperfect imitation of Italy. The revival of a genuine Flemish art came with Rubens, to whom naturally a considerable space is devoted, and of whom the author speaks with the degree of enthusiasm which Rubens, as a painter and as a man, does naturally evoke, in spite of all the faults, and in some sense, vulgarities, of his art. These faults the author does not omit to emphasise strongly, but he does full justice at the same time to the greatness of this princely man and powerful painter, who will always be one of the finest and most fascinating figures in artistic biography.

In considering the Dutch School, the author devotes some attention, first, to an earlier and little known Dutch School, the school of the fifteenth century, or commencing in that century, and having little affinity with the brilliant realistic school of the seventeenth century. In commenting on this latter school, we observe that the author does admit the existence of something higher than mere realism in the great Dutch painters, and his remarks on this subject are very good. "We must not suppose that the Dutch School in its realistic character presents nothing but a brutal materialism, and never rises above the delineation of drunken boors at a village inn. There is a *truthfulness* in the Dutch pictures which commands admiration; a dead tree, by Ruisdale, may touch a heart; a bull, by Paulus Potter, may speak eloquently; a kitchen, by Kalf, may contain a poem. All the painters of this school confined themselves to loving, understanding, and representing nature, every one adding his own feelings and tastes,—in fact, adding *himself*. If we visit various parts of Holland in different kinds of weather we shall see how each painter identifies *himself* with the special aspect which he depicts. A barren, gloomy landscape under a leaden sky, unrelieved by living creature, its grim monotony only broken by a waterfall or a dead tree, at once shows in Jacob van Ruisdael the melancholy Jacques of landscape painters, who finds 'tongues in trees, books in the running brooks, sermons in stones.' A bright early morning, when the sun flashes merrily on white sails and glancing streams, and the fat cattle are browsing knee-deep in the rich meadows, reminds us of the lover of light, Aelbert Cuyp. A warm afternoon, when the shadows of the fruit-trees lie across the orchard, and an ox, or horse, or some other animal lies in the grateful shade, tells us of Paulus Potter, the Raffaelle of animal painters, the La Fontaine of artists"; and several other illustrations are given. To some of the painters of interiors the author scarcely seems to do the same justice. He dismisses Ter Borch* (Terburg) very slightly, observing that his *spécialité* was the painting of a white satin dress, by which the chief light in his pictures is formed. But if there is not poetry and imaginative feeling in some of the figures which wear this dress, those qualities can seldom be claimed for any figures in the costume of real life. The illustration of Terburg given on the opposite page, the picture of "The Letter" (in the Hermitage) is, in itself, an example of this. The figure with her back to us is, nevertheless, full of expression and character.

While commending the general tone of the book in its literary style and critical remarks, we may bestow more than commendation on the illustrations. For a five-shilling book they are really marvellous in number and style of execution.

* A special point is made in the book of giving the correct spelling of all the painters' names, and not the forms into which they have been corrupted.

Miscellanea.

Auckland New Cemetery.—At a special meeting of the Auckland Burial Board on the 14th inst., Canon Long presiding, Mr. Pritchett, the architect, attended, when forty-two tenders for the laying-out of the grounds and erecting the necessary buildings for a cemetery were considered. It was, however, decided to call a vestry meeting for the purpose of securing sanction, as required by law, to the proposed expenditure; and the further consideration of the tenders was adjourned till after the vestry meeting.

Mr. Poynter, R.A.—We understand that Mr. Poynter, R.A., has resigned his office of Director for Art and Principal of the National Art Training School at South Kensington.—*Times.*

Metropolitan Provident Medical Association.—On Saturday afternoon, at the invitation of the Duke of Westminster, a meeting was held at Grosvenor House to consider the claims of the Metropolitan Provident Medical Association and its subsidiary financial ally, the Metropolitan Dispensaries Joint-Stock Company (Limited). The object of both is to extend to the working classes, in every part of London and its environs, on terms within their means and consistent with their independence and self-respect, the advantage of medical treatment on the same satisfactory footing on which it is enjoyed by the upper classes, including skilled nursing and a recommendation to a general or special hospital when the case requires it. It had been announced that the duke himself would preside; but at the outset of the proceedings Sir Charles Trevelyan read a letter from his Grace regretting his inability to be present, but expressing his deep sympathy with the movement, in proof of which he said he had subscribed for 500 fully paid-up shares of 1*l.* each in the financial company. In these circumstances Mr. Stansfeld, M.P., the chairman of the Association, presided. Mr. Stansfeld, having briefly defined the object of the meeting, said the conditions on which they were asked to invest in the company afforded a safe guarantee that their money would not be wasted. Proper medical treatment for the working classes was greatly needed, and many had been studying how that want could best be met. He believed that the solution of the problem would be found in provident dispensaries. The present system of gratuitous outdoor medical relief tended to demoralise and to pauperise, and they wanted to cover London with self-supporting dispensaries. The Metropolitan Provident Medical Association would take upon itself the propaganda, and would help the dispensary during its infancy, and until it should become self-supporting and therefore self-governing. The amount of capital which was wanting from the public for the subsidiary limited company was 50,000*l.* Resolutions in favour alike of the association and of its financial auxiliary were carried, after addresses by Sir Rutherford Alcock, Sir Sydney Waterlow, M.P., Mr. Timothy Holmes, F.R.C.S., Mr. W. G. Bunn, Sir Charles Trevelyan, and others.

Industrial Schools.—On Monday last an industrial school for girls, on the principle of the industrial schools for boys, was opened at Feltham, Middlesex, under the auspices of the Middlesex magistrates and others. The magistrates of Middlesex since 1854 have passed through the boys' school at Feltham 4,000 of the juvenile offenders, 83 per cent. of whom had turned out well. Encouraged by this success, the magistrates endeavoured to raise by public subscriptions the means of building an industrial school for girls, and funds were subscribed for the purpose of rescuing young girls under fourteen years of age, charged, in many cases, with slight offences, from the disgrace of a prison. The school built for the purpose and ends thus described stands within a mile of Feltham Station, on the South-Western Railway. Mr. E. E. Antrobus, J.P., one of the committee, conducted the visitors over the school, and said it was nearly twenty years since he had first proposed to the Middlesex magistrates that they should apply for an Act of Parliament to enable them to establish industrial schools in the county. The building was judged by the company to be well adapted for its purpose of training girls to an industrial life.

City Churches.—At a meeting of the Council of the City Church and Churchyard Protection Society, Mr. E. B. Ferroy in the chair, the following resolution, proposed by Mr. Henry Wright, honorary secretary, and seconded by Mr. H. C. Richards, was carried *nem. con.*:—"That the Council of the City Church and Churchyard Protection Society regret the recent attack upon the City churches, and the threatened wholesale destruction of so many more, which they, on behalf of their numerous members throughout England, pledge themselves systematically to oppose by every means in their power."

Parish of St. Mary-at-Hill.—The Vestry of this parish have elected Mr. Alexander Peebles, F.R.I.B.A., of Salters' Hall-court, Cannon street, as their surveyor, in succession to the late Mr. John Collier, deceased.

Public Hall, Belper.—The directors have selected the design submitted by Mr. John Johnson, architect, Queen Victoria-street, London.

A New Cemetery for St. George's, Gloucestershire.—On the 12th inst. Mr. S. H. Terry, C.E., Local Government Board Inspector, held an inquiry at the Parochial Offices, St. George's, respecting an application which had been made by the St. George's Local Board to the Local Government Board for their sanction to the borrowing of 5,000*l.* for the purpose of providing a cemetery for the parish. The chairman of the Board (Mr. W. Butler) and several parishioners, were present. The Rev. A. R. D. Flamsteed explained the position in which the parish was placed owing to the want of accommodation for the burial of the dead. The parish churchyard was practically full two years since, and he had consequently written to the Local Board and to the authorities in London desiring that steps should be taken to provide a cemetery. The accommodation in other graveyards in the parish was comparatively *nil*. The surveyor (Mr. W. Dawson) showed the plans he had prepared for the proposed cemetery. The Inspector commented on the clear way in which the surveyor had arranged the grave space; he had not before seen grave spaces so arranged. The paths, which in most cemeteries took up one-sixth of the ground, in Mr. Dawson's plans only occupied one-eighth. He was favourably impressed with the proposed cemetery, and should report in accordance with what he saw and heard.

Hospitals for Paying Patients.—On Monday afternoon the third annual meeting of the Home Hospitals Association for Paying Patients, of which the Duke of Northumberland is president, was held at No. 17, Fitzroy-square, W. In the unavoidable absence of the president, Earl Percy, M.P., was called to the chair. Mr. R. A. Owthwaite, the secretary, read the report, which gave a most favourable account of Fitzroy House, No. 16, in the square, which has been established as a hospital to test the principles of the association, and recommended the purchase of the next house, that in which the meeting was held, which might then be set apart for lady patients, reserving Fitzroy House for gentlemen. The report was adopted on the motion of the chairman, seconded by Sir Rutherford Alcock, K.C.B. Dr. Quain proposed "That it is desirable to raise 5,000*l.*, with the object of purchasing the freehold of No. 17, Fitzroy-square, and for finding funds for the necessary fittings and furniture, for providing additional accommodation of a similar kind to that already afforded at Fitzroy House." This was seconded by the treasurer, Mr. Frederick Cox, and carried unanimously.

Fire at Messrs. Doulton's.—On Sunday morning, shortly after eight o'clock, a destructive fire broke out in High-street, Lambeth, upon the extensive premises of Messrs. Doulton & Co., potters, &c. The fire commenced in a large building of recent erection, four floors in height, about 80 ft. by 60 ft. in dimensions, and as an instance of its rapid spread it may be stated that the roof fell in within some twenty minutes of the first arrival of the engines. When the firemen ceased playing upon the premises, the building in which the fire had originated was completely burnt out and the roof destroyed, while an adjoining building of three floors, about 200 ft. by 70 ft., used as moulding-rooms, had, with its contents, been seriously damaged by fire, heat, and water. The cause of the fire is officially returned as "unknown," but it is believed that it was the overheating of a kiln. Messrs. Doulton are insured in the Queen and the Scottish Union offices.

Bursting of a Water-main.—About nine o'clock on Monday morning the Grand Junction Waterworks Company's trunk-main burst in Goldhawk-road, Shepherd's-bush. The pipe is 30 in. in diameter, and as it was connected with a very large head of water, a serious flood was occasioned. The pressure burst up a large portion of the road, but fortunately little or no damage was done to private property. The chairman of the company asks us to state that every effort is being made to restore the water-supply to the town district.

New Shop door Latch.—Messrs. Sabatier & Co., whose special business appears to be to supply ironmongers with all kinds of French hardware, have lately introduced a new latch adapted for doors which are opened hundreds of times in a day. The main part is a coil spring of a steady action, while the lever handles allow a gentle pressure, though the spring is very strong, and is easily removed to allow the shutter to be fixed when closing. This latch being nickle-plated has a good appearance.

The Brighton Parade Fence.—The Marine-parade at Brighton has received an addition which is both useful and ornamental, in the shape of a fence. It commences at the aquarium and terminates at the junction of the Madeira-road with the Marine-parade, not far from the eastern boundary of the town. The straight portion, which is fixed at the edge of the cliff, is 5,400 ft. long, and consists of massive iron standards placed 8 ft. centre to centre, each weighing 3¼ cwt., between which are bolted panels weighing 4¼ cwt., and a top rail of teak 4 in. in diameter is fixed above, forming a comfortable rest for visitors to lean upon. At intervals there are ten balconies which form recesses for seats, from which an uninterruped view of the sea, beach, and Madeira-road below can be obtained. There are also four flights of stone steps nearly 50 ft. high, down which similar iron fencing has been fixed, and this, added to the straight part, gives a total length of 6,160 ft. of ironwork. The standards are placed on a bed of Portland cement concrete, and a wall of the same material is formed round and between them forming a facia and coping 2 ft. 6 in. on the front. Altogether there are about 350 tons of iron and 750 cube yards of concrete. The stone steps and footpath have also been relaid throughout. The fence was designed by Mr. P. C. Lockwood, the borough surveyor, and the works have been set-out and superintended by Mr. W. Parsey. Messrs. C. Reed & Son, of Brighton, supplied and fixed the ironwork, and Mr. J. G. B. Marshall was contractor for the concrete and other work. The fence has been carefully ranged to straight and curved lines on the top of the old wall which is not quite regular on plan, and the gradients of the fence have been arranged to give as nearly as possible a uniform fall for the water to the kerb.—*Iron.*

The Social Education of Workmen.—The fourth annual meeting of the Workmen's Social Education League was held last Saturday in the hall of the Society of Arts, under the presidency of the Earl of Dalhousie. From the annual report it appeared that the league had made satisfactory progress during the last year. Since the last annual meeting 201 lectures had been delivered. The committee had reason to believe that the lectures which had been given had led to a considerable amount of individual reading and study on the part of those who had attended them. The balance-sheet showed that whatever success had been achieved had been attained at a trifling cost, in consequence of almost all the work having been done gratuitously. The chairman, in moving the adoption of the report, said the society had been about three years in existence, and it was only last year that it had suddenly struck into something like prominence. Its object was to organise lectures and discussions, especially in working men's clubs and working men's institutes on such matters as history, social and political science, economical science, &c., in order to lay the groundwork in men's minds for the formation of mature and solid opinion upon political questions. The report was adopted. Among the resolutions was one for the changing of the name of the society to "Social and Political Education League."

Royal Architectural Museum.—We have received a letter from the chief officers of this institution, now hidden away in Tufton-street, Westminster, appealing to the public for assistance. An ill-contrived building on an ill-selected site have been the almost fatal obstacles to its progress against which it has had to fight. The writers say:—

"The museum has, in addition to its other objects, a sketching-club, which is much used. Unhappily, however, at a time when this museum has won for itself a solid and grateful recognition by workmen such as it has never before been able to claim, it finds its usefulness much crippled owing to the death of many of its old subscribers, and the difficulty experienced in securing the sympathy of fresh friends to whom its early struggles are naturally unknown. The amount required, in addition to its present income, to keep the museum afloat is about 200*l.* a year, and for this sum its managers earnestly plead. Donations and subscriptions will be received by Mr. R. Druce at the Museum, or by our bankers, Messrs. Cocks, Biddulph, & Co."

Land in Yorkshire.—At the Mart, on Wednesday in last week, Messrs. Edwin Fox & Bousfield sold the Finningley Estate, Yorkshire, consisting of 2,418 acres, which, with the buildings and cottages, thereon, produces a rental of 2,200*l.* The first offer for the property was 40,000*l.*, and the biddings advanced to 60,000*l.*, at which amount it was sold.

Gas Explosion at Camden Town.—A singular explosion, which might have been attended with very serious consequences, occurred early on Wednesday morning in the Chalk-farm-road, Camden-town. The road crosses the Regent's Canal by an iron girder bridge, erected four years ago. The roadway is divided from the foot pavements by hollow girders made of heavy iron plates, with cappings and other ornaments. The gas company, instead of running their main along the bridge in the ordinary way, have, it is stated, made use of one of these hollow girders as a pipe or tube for connecting their main. About half-past five o'clock on Wednesday morning a lamplighter, who was cleaning a lamp close by, noticing a strong smell of gas, approached the girder with a light. A violent explosion followed, splitting the girder, throwing the man into the roadway, and doing considerable damage to the bridge. One portion of the girder, weighing about 8 cwt., was blown a distance of 16 ft. The lamplighter was fortunately uninjured. Mr. Booth, the surveyor of the district, was soon on the spot with some of his men. He did not find it necessary to stop the traffic. Later in the day Mr. Booth Scott, the chief surveyor, accompanied by several members of the Committee of Works and the manager and district superintendent of the gas company, made a minute examination. It is supposed that the ironwork having expanded from the heat of the weather, air had made its way into the hollow cappings and so become mixed with the gas. Had the explosion occurred half an hour later, large numbers of men would probably have been crossing the bridge on their way to work.

The Westmorland Sea-Green Slate is now protected by a registered trade-mark, which may be seen by referring to our advertising columns. We find, by a reference-list sent to us, that these slates are largely used for the best buildings in the British Isles, and are evidently in favour with the leading Gothic architects of the day. Amongst the buildings covered with these slates we notice St. Thomas's Hospital and a long list of other important structures.

Bow-street Police Courts.—Complaints reach us of the bad acoustic qualities of the new Police Court in Bow-street.

TENDERS

For buildings for the Moseley and Balsall Heath Institute, Birmingham. Mr. W. Hale, architect. Quantities supplied:—

S. Taylor	£4,100 0 0
T. Smith	4,000 0 0
W. H. Parton	3,933 0 0
J. Moffat	3 7 3 0 0
W. Matthews	3,726 0 0
J. Barnsley & Sons	3 678 0 0
W. Brooks	3,655 0 0
B. N. Smith	3,548 0 0
J. Bowen	3,494 0 0

For finishing three detached dwelling-houses at Wallington, Surrey, for Messrs. Parkers. Mr. A. Bradley Rooke, architect. No quantities:—

Rose	£1,785 0 0
Hazell	1,610 0 0
Young & Co.	1,470 0 0
Uff	1,416 0 0
Knight	1,286 5 0
J. O. Richardson	1,2?7 0 0
Baxter	1,130 0 0

For alterations, &c., to the Green Dragon, Poplar, for Mr. Davis. Mr. W. E. Williams, architect:—

Wood & Sleep	£478 0 0
Eaton	464 0 0
Marr	441 0 0

For rebuilding the Roebuck, Enfield Highway, for Messrs. J. Carter, Wood, & Co. Quantities by Mr. E. Crutchloe:—

Curtis	£2,410 0 0!
Field & Sons	2,2?6 0 0
Toms	2,126 0 0
Boyce (accepted)	1,970 0 0
Tyers	1,?60 0 0!

For alterations and decorations to 17, Kensington Garden-terrace, for Mr. A. Stuart:—

John Vears & Co. (accepted)	£750 0 0

For alterations and additions to 48, Baker-street, for Mr. W. J. Jameson:—

John Vears & Co. (accepted)	£391 0 0

For warming and ventilating the new schools, Stockton-road, Sunderland, with new hydro-caloric apparatus. Mr. J. P. Pritchett, architect:—

J. Weeks & Co. Chelsea (accepted)	£2?3 17 6

For manager's house and boundary-walls for Sevenoaks Gas Company. Mr. A. Penny, architect:—

Duntnell, Brasted	£1,039 0 0
Haisman, Foots Cray	1,007 0 0
Wiltshire, Sevenoaks (accepted)	1,005 0 0

For building a stable in the Station-road, Forest Gate, for Mr. G. Roberts. Mr. R. Brown, architect:—
Dyer & Son (accepted).

For the erection of a villa in Haling Park, Croydon. Mr. D. R. Dale, architect:—
For concrete basement:—
Hoare & Son, Blackfriars-road (accepted).
For the superstructure:—

W. Marriage, Croydon	£4,294 0 0
T. W. Smith & Son, Essex-road, Islington	4,190 0 0
Maides & Harper, Croydon	4,170 0 0
Barton, Walthamstow	4,146 0 0
Faulkner, Old Kent-road	4,123 0 0
Hoare & Sons, Blackfriars-road	3,987 0 0

For the erection of a new folding-room at the Steyne Mills Laundry, Acton, for Messrs. Rush & Co. Mr. E. Monson, jun., architect. Quantities supplied:—

E. Eydmann, Acton	£387 0 0
C. Maton, Kew	347 0 0
J. Dorey, Brentford	338 0 0
T. Nye, Ealing (accepted)	319 5 0

For erection of a house and laundry in Strafford-road, Acton, for Mr. T. J. Howell. Mr. E. Monson, jun., architect:—

T. W. Whiteman, Acton (accepted)	£300 0 0

For the erection of a new wing to the Infirmary for the Guardians, Brentford Union, Isleworth. Mr. E. Monson, jun., architect. Quantities by Mr. F. T. W. Miller:—

C. W. Reading, Belgravia	£4,089 0 0
Shuff & Co., Acton	4,081 0 0
Stevens & Bastow, Bristol	3,859 0 0
Nightingale, Lambeth	3,797 0 0
Vernon & Ewens, Westminster	3,790 0 0
H. Haynes, Alperton	3,750 0 0
T. Taylor, Uxbridge	3,700 0 0
G. Gibson, Southall	3,489 0 0
Jones & Co., Gloucester	3,450 0 0
T. Brunsden, Brentford	3,425 0 0
T. Hiscock, Hounslow	3,399 0 0
J. Beauchamp, Brentford	6,375 0 0
C. Maton, Kew	3,350 0 0
C. Claridge, Banbury	3,320 0 0
J. Dorey, Brentford (accepted)	3,099 0 0

For the erection of three shops on the Ravensworth House Estate, Fulham-road, Walham-green. Mr. E. Monson, jun., architect:—

G. Lyford, Hammersmith (accepted)	£2,000 0 0

For building three shops in the Broadway, London Fields, for Mr. J. Elves. Mr. E. Brown, architect:—

C. Marr	£2,673 0 0
T. Nixon	2,647 0 0
F. & F. J. Wood	2,567 0 0
J. Uff	2,445 0 0
J. H. Johnson	2,353 0 0
W. Shurmur	2,277 0 0
S. Salt	2,255 0 0
Hawkings	2,100 0 0

For the erection of manager's house and boundary-walls at the Gas Works, Sevenoaks, for the Sevenoaks Gas Company. Mr. A. Penny, architect:—

Durtnall	£1,039 0 0
Haseman	1,007 0 0
Wiltshire (accepted)	1,005 0 0

For painting, &c., to the United Westminster Schools, for the Governors. Mr. R. R. Arnts, architect:—

Clemence	£485 0 0
Smith & Co.	462 0 0
McLachlan & Sons	398 10 0
King & Son	398 0 0
Adamson & Sons	376 0 0
Smith	350 0 0
Wilkes	270 0 0

For repairs and decorations to 97, Westbourne-terrace, for Mr. M. Jaffé. Messrs. Joseph & Pearson, architects:—

McLachlan & Sons (accepted)	£640 0 0

For the erection of mineral water premises, for Mr. E. Bonser, Nottingham. Mr. F. Jackson, architect:—

Bell & Son	£1,176 10 0
Marriott & Wartnaby	1,157 10 0
E. Hind	1,119 0 0
R. Middleton	1,050 0 0
Smith & Attewell	1,029 18 10
Huskinson & Jefferys (accepted)	1,014 0 0

For the raising of master's house of All Saints' Schools, Nottingham. Mr. F. Jackson, architect:—

Bell & Son	£163 0 0
Smith & Attewell	150 10 0
R. Middleton	150 0 0
Huskinson & Jefferys	145 14 0
Marriott & Wartnaby (accepted)	135 0 0

For raising roof and erecting new floor, in building at west side of Imperial Colour Works, Bow, for Messrs. J. W. & T. A. Smith. Mr. A. Ashbridge, architect:—

Palmer	£120 0 0
Calnan & Co.	105 0 0
Goodman*	95 0 0

* This tender did not include surveyor's fees.

For repairs to roofs, &c., at the Vine-street Casual Wards, for the Guardians of the Poor of the Holborn Union. Messrs. H. Saxon Snell & Son, architects:—

Howard	£298 0 0
Bamford	220 0 0
Morris	200 0 0
Patten (accepted)	182 0 0

For repairs to houses in Luscombe-street, Wandsworth-road, for Mr. F. J. Purssord. Mr. R. Cruwys, architect:—

Smart, Brixton	£160 0 0
Stevens, Wandsworth	120 0 0
Farquharson, Wandsworth (accepted).	

For rebuilding Wisbey Wharf, Bow-common, after fire, for H. W. Walden:—
Parrish (accepted)

For alterations and additions to the Prince of Wales public-house, Deptford, for Mr. E. Behrens:—
Parrish (accepted)

For Board schools at Orpington, Kent. Mr. J. Ladds, architect:—

Watson & Dennett	£2,447	15	0
Taylor & Son	2,289	0	0
J. E. Julian & Co.	2,226	0	0
Gallard	2,221	0	0
Morris	2,220	0	0
Payne	2,205	0	0
Haisman	2,200	0	0
Wright	2,193	0	0
Eldridge & Gee	2,188	0	0
Elwig	2,133	0	0
Bingham	2,126	0	0
Marsland	2,110	0	0
Willicomb & Oakley	2,100	0	0
Jones & Co.	2,062	0	0
Higgs	2,049	0	0
Beale & Son	2,030	4	9
Warr	2,022	15	0
Waite (accepted)	1,846	5	0

For alterations and additions to the Downs, Lawrie Park, Sydenham. Messrs. Edwin & W. Hilton Nashe architects:—

Greenwood	£1,693	0	0
J. & C. Bowyer	1,689	0	0
S. J. Jerrard	1,669	0	0
O. Jarrett	1,494	0	0
C. Coles (accepted)	1,479	0	0

For a pair of houses, coal-store, and stabling for Mr. H. Moore, at Ryde, Isle of Wight. Mr. R. J. Cornewall Jones, architect. Quantities supplied:—

Stevens & Sons, Southampton	£2,246	0	0
Jenkins, Bros., Ryde	2,135	0	0
Light & Co., Portsmouth	2,102	0	0
Barton, Ryde	2,070	0	0
Barwaker, Southsea	2,050	0	0
Jolliffe, Sandown	1,980	0	0
Sibley, Ryde	1,756	5	0
Saunders, Ryde	1,745	0	0
Meader, Ryde	1,650	0	0
Salter, Ryde	1,550	0	0
Hutchings, Binstead	1,511	0	0

For the Pinner sewerage and outfall works:—

H. Haynes, Alperton, Harrow	£11,450	0	0
F. Larter, Harrow Weald	11,070	0	0
W. Botterill, Cannon-street	10,551	0	0
J. Cardus, Acton	9,900	0	0
G. Stevenson, Eckington, Derbyshire	9,810	0	0
C. Killingback, Camden Town	9,750	0	0
J. Jackson, Upton, Essex	9,740	0	0
Bottoms, Bros., Battersea	9,104	0	0
J. Neave, Lewisham	8,940	0	0
Nowell & Robson, Kensington	8,690	0	0
R. Nicholson, Chelmsford	8,639	3	4
Ford & Co. Great Queen-street	8,200	0	0
J. Kindell, Harrow	7,920	0	0
W. Coker, Great Hadham	7,591	13	0
G. G. Rayner, Bootle, Liverpool	7,340	0	0

For alterations and additions to the London and South Western Bank, Camden Town Branch, 68 and 69, Parkstreet. Messrs. J. & J. S. Edmeston, architects:—

	If wholly in Stone.	If in Cement.
Higgs & Hill	£4,430	£4,230
R. White	4,248	3,999
Gould & Brand	4,187	3,947
Clarke & Bracey	4,160	3,720
T. Nye	4,058	3,619
J. Smith & Son	4,037	3,696
Boyce	3,989	3,789
W. Smith & Son	3,888	3,610
Lucas & Son	3,441	3,110

For the erection of a cottage in Croft-road, Carshalton, Surrey, for Mr. P. C. H. Jay. Messrs. Ebbetts & Cobb, architects. Quantities supplied:—

Clarke & Bracey	£587	0	0
Langley & Pinkham	568	8	0
Humphries	529	0	0
J. O. Richardson	529	0	0
Stewart	528	0	0
Ward	520	0	0
Evans	498	0	0
Holt	466	13	3

For Cardiff Church. Mr. H. T. Northcroft, architect. Quantities supplied:—

Wall & Hook, Brimscombe	£10,500	0	0
Estcourt, Gloucester	8,989	0	0
Stephens & Bastow, Bristol	8,649	0	0
Shepton, Cardiff	8,340	0	0

For cottages at Hutton Cranswick, for Mr. Dosser. Mr. W. Hawe, architect:—

T. T. Dickinson, Driffield	£486	0	0
M. Gage, Driffield	480	0	0
G. & R. Pape, Beverley	435	0	0
John Barnes, Beverley	390	0	0

For farm buildings at Hayes Gate Farm, Hayes, Middlesex, for Mr. H. P. Cotton:—

Hunt	£850	0	0
A. & B. Hanson	837	0	0
Postlethwaite	726	0	0
Pocock	823	0	0
Kearley	649	0	0

For building new wing and alterations to 106, Westbourne-terrace, for Mr. A. L. Cohen. Messrs. Joseph & Pearson architects:—

M'Lachlan & Sons (accepted)	£1,598

For alterations and additions for Messrs. Grant & Grant, Forest Hill. Mr. Goodsack, architect. Quantities supplied:—

Heath	£1,910	0	0
Marriage	1,899	0	0
Masters	1,785	0	0
Potterton	1,697	0	0
Taylor & Parfitt	1,690	0	0

For alterations to business premises at Leytonstone, for Messrs. F. Dutch & Co. Mr. D. R. Dale, architect:—

Farr & Co.	£437	0	0
Hoare & Sons	425	0	0
Arber (accepted)	360	0	0
Barton	351	0	0

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